

# MODERN Machine Shop

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MAY, 1945

# Contents

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# ARMSTRONG



## **The "Armstrong System" permits the new higher cutting speeds**

The urgencies of war have lead to the universal use of greatly increased cutting speeds. Today it is not uncommon to find production machine tools actually operating many times faster and with greater efficiency than the "standard" cutting speeds of past generations permitted. What is not generally understood is that a similar step-up is equally practical for ordinary operations on standard tool room lathes, planers and shapers.

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ARMSTRONG TOOL HOLDERS Are Used in Over 95% of the Machine Shops and Tool Rooms



# MODERN Machine Shop

MAY, 1945

VOL. 17, No. 12

CINCINNATI, OHIO

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## We Present ---

—as the feature article in this month's issue—an interesting story regarding a special trade school for women workers that has proved successful at the John Inglis Co., Ltd., Toronto, Canada. Illustrations show views of classrooms at John Inglis Trade School, as well as the tools and equipment used at this school in training women workers.

—on page 134—an article by H. A. Bolz, associate professor of mechanical engineering, Purdue University, which illustrates and explains how many of our most precious metals are being put to work side by side with their more common relatives in the production of guns, ordnance instruments, planes, and other products.

—on page 160—the concluding section of the article "Safety Is Good Business" in which the author—John E. Hyler—presents a number of devices for guarding power presses.

—on page 180—Henry R. Power's article "The Composition of Abrasive Products" in which is described a method for critically examining the physical structure of abrasive compositions.

—on page 198—under the heading "Ideas from Readers," the designs of various tools and equipment for performing a wide variety of operations with maximum speed, efficiency, and safety.

—on page 222—the usual illustrated announcements of new shop equipment and materials, followed by the monthly cartoon and other features.

—a reminder that the Seventh War Loan drive will get under way shortly. But right now is the time to begin to help our boys to Berlin!

May, 1945

MODERN MACHINE SHOP 123



Special Trade School for Women Workers at John Inglis Co. Ltd., Toronto.

# Training Women Workers at John Inglis

**A Machine Shop Apprentice School for Women Workers  
has proved successful at John Inglis Co. Limited.  
Here is the story.**

By H. O. STOCK

**I**N May, 1938, the John Inglis Co., Limited, Toronto, received a contract for the manufacture of the 0.303-inch Bren Light Machine Gun for the British and Canadian Governments, production to be on a batch basis.

The Company, from its past manufacturing experience, felt that women could be trained for certain of the simpler repetitive operations which they would be able to perform efficiently and in the fall of 1938 obtained ap-

proval to hire six girls on a trial basis.

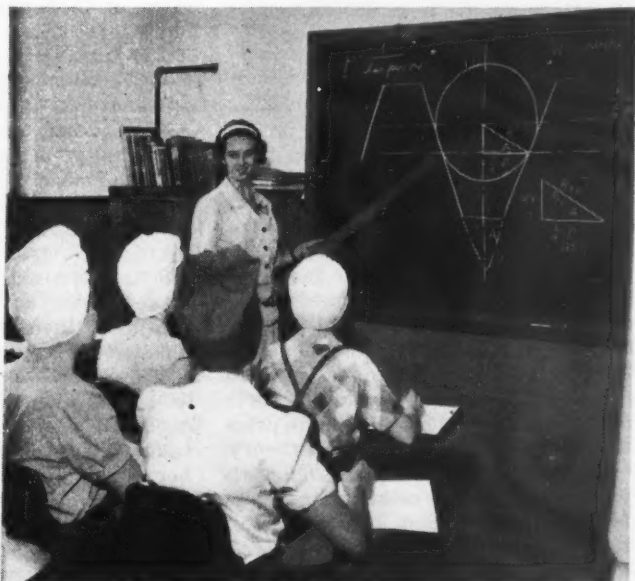
With the opening of hostilities in Europe in September, 1939, Canada, as a part of the British Empire and because of its strategic location, found its importance as a source of supplies multiplied. Amongst the largest of Canada's peace-time industries, the John Inglis Company offered its plants and the experience it had already gained in the manufacture of the Bren gun to the Government for the manufacture of fighting equipment, and in turn received contracts necessitating the construction of new buildings and the planning of necessary equipment with which to do the job.

An organization was set up to ensure an adequate supply of machines, tools, supplies and labor. Of these requirements, labor soon became the most critical item. Younger men were entering the armed forces and the availability of suitable labor for a time seemed to dwindle in direct ratio to the increase in the tasks to be performed. Only one answer to this problem remained—the vacant jobs would have to be filled by women.

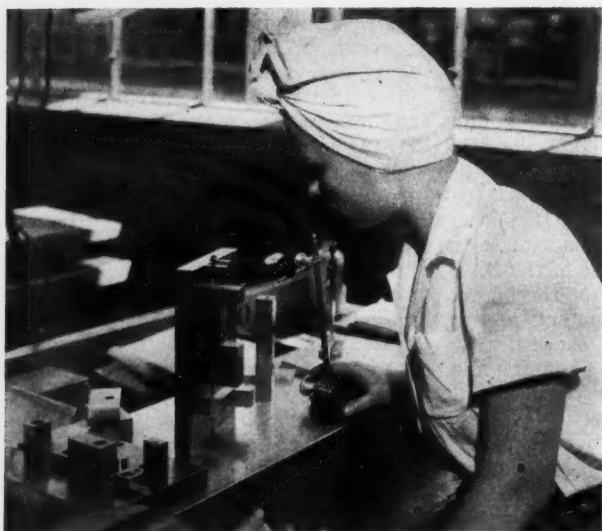
When women were first introduced to shop work, they were utilized only as machine operators, bench hands, and so on. Female workers available

for this purpose in most cases had no previous machine experience or technical knowledge. Accordingly, such girls when first hired were not allowed to immediately enter the shop, but instead were sent to a local Technical School where they received two weeks' training in Elementary Machine Shop Practice, including the way to handle a screwdriver, pliers, and benchwork such as filing, and so on. Women who completed this short course were no longer entirely green, and therefore better able to quickly adapt themselves to shop work. In this way thousands of girls previously occupied as wives, shop girls, maids and office workers were soon obtained for war work and successfully utilized in essential shop operations.

As the manpower requirements of both the armed forces and industry increased, a serious shortage of machinists, lead hands, set up men, and tool-makers appeared inevitable. In anticipation of such emergency the man-



Looking in Through Door of Classroom at John Inglis Trade School. Miss Dorothy Stone, Instructress, is Explaining a Problem in Thread Measuring with Wires



Each Student Learns how to Inspect Gages, Tools, and Fixtures, Using the Dial Indicator, Gage Blocks, and other Measuring Tools

agement further developed the idea of utilizing women for such tasks. Accordingly plans were made to establish a trade school on the premises for the instruction of girls in machine shop practice.

Women are not, as a rule, mechanically minded, but once interested in a mechanical task, the average woman will master it just as quickly as the average man. Plant executives who have had experience in the handling of women plant workers well know that on tasks where small, light parts are involved, women are much more adept than men, partly due to the fact that their fingers are much more accustomed to handling small light objects. Girls are not, however, accustomed to tools or machinery and to make a good mechanic out of a woman requires suitable and sufficient training in practical machine shop work and theory.

Candidates are selected from girls who have spent one or more months as operators in the shop, and during this time have demonstrated their interest and aptitude in mechanical tasks.

fundamentals of heat treatment, and technology as it relates to machines and tools.

The women apprentices spend a minimum of 18 hours per month or 1½ hours a day in the classroom; the rest of the time they spend in the school shop working on practical jobs. After a girl has had the machine controls explained to her, and has been given an opportunity to grasp the principle of the machine, she is shown how to set up a job in the machine, how to set the cutting tools, and how to proceed with taking the required cut on the work. She is given one day to practice on scrap parts, or parts that can be scrapped; then she is expected to be able to turn out parts that can be used.

The classroom course in mathematics begins with simple arithmetic; the candidate's mathematical ability is not taken for granted, nor is any part of her training overlooked. As a preliminary, she is given an examination in which she is expected to be able to define the following: digit; prime number; factor; terms; sum; difference;

The only educational requirement for a girl to become an apprentice is graduation from grammar school. All trainees are paid while learning and given raises as their proficiency increases. The course includes classroom training in mathematics, the

remainder; product; integer; dividend; divisor; quotient, and prime factor. If she is weak on any of these definitions, she is instructed accordingly.

Lesson 2 deals with the excess of nines, in which she learns to (a) find the excess of nines of any number, and (b) check addition, subtraction, multiplication, and division by excess of nines. Lesson 3 deals with the Rule of Signs. In Lesson 4, she learns to know the definitions of a Multiple, Common Multiple, Lowest Common Multiple, and then finds the Lowest Common Multiple of a group of numbers.

Lesson 5 teaches the definitions of a Vulgar Fraction, Proper Fraction, Improper Fraction, Mixed Number, Numerator, Denominator, Lowest Common Denominator, and Reciprocal. She is also expected to find the answers to problems in which these factors are involved, including the changing of fractions to mixed numbers, and vice versa.

Lesson 6 takes up the addition, subtraction, multiplication and division of decimals, or any combination of these, and the changing of decimals to fractions and vice versa. In this lesson the student is also taught to know Decimal Equivalents up to 16ths and to calculate Decimal Equivalents up to 64ths by the short method. Lesson 7 deals with percentages.

In Lesson 8 the student-apprentice is taught definitions of a Power; Root; Square Root; Index; Exponent; Radical Sign; Radicand, and Trial Divisor. The student is given problems in finding the given power of a number, and learns to find the square root, checking by excess of nines. Lesson 9 concerns Ratio, Proportion, Antecedent, Consequent, Means, and Extremes. Lesson 10 instructs in short cuts, such as multiplication by 5, division by 5, multiplication by 25, and so on.

The student is also given a working knowledge of Algebra, Trigonometry, and Geometry, with practical applications. In further lessons she is instruct-

ed in the uses of shop measuring tools and in blue print reading and sketching, and at regular intervals she is required to take an examination upon the subjects in which she has been instructed.

A certain amount of time is given to instruction in bench work, in which the student is taught the uses of the different kinds of chisels and files, the uses of the hacksaw and the difference in



Inspection Tools of the Highest Quality Enable the Students to Check Their Own Tools for Accuracy

the blades for different metals, and the use of the hammer, screwdriver, and lapping tools. She is also taught to distinguish between slip fits, press fits, running fits, shrink fits and lap fits, and is instructed in the methods and procedure of checking a jig or fixture.

Upon assigning a student to a machine, she is first taught the names and functions of the various parts of the machine, and the uses of any accessories that are generally considered as

a part of the machine equipment. For instance; upon assignment to a drilling machine, the student is taught the uses of the different types of tables, V-stands, V-blocks, the drift, and the chucks. She is also instructed in the uses of the various types and kinds of drills, reamers, counterbores, hollow mills, taps, and so on.

Upon attaining satisfactory proficiency in the operation of a given type



With This Machine and its Magnifying Scope the Student Grinds a Die Section to Form within a Fraction of a Thousandth of an Inch

of machine, the student is assigned to another; thus in turn she learns to operate the drill, shaper, lathe, surface grinder, cylindrical grinder, profiling machine, and other machines comprising the training school equipment. At intervals the student is given an examination, consisting of an oral test in which she is required to identify the various parts of the machine, and a written examination concerning the operation and care of the machine.

In the written part of the lathe examination, the student is queried upon the different types of threads, the major diameter, minor diameter, root, and crest of a thread, the method of checking a thread for the required number of threads per inch, and so on. She is also taught to measure a thread by the use of wires.

The written section of the surface and cylindrical grinding examination includes such questions as (a) Why should the magnetic chuck be kept in first class condition? (b) Why do you dress a grinding wheel, and what effect does it have on the work involved? (c) On a cylindrical grinder, what is the direction of the wheel in relation to the work? (d) What is a sine chuck, and why and how is it used? (e) How is the taper in a job adjusted on the cylindrical grinder? (f) What is the best kind of wheel to use to avoid excessive heat when surface grinding? (g) How does excessive heat in grinding affect the work? (h) When grinding a chrome-plated surface, what is the amount to take off in each cut and why? (i) Why should a job be demagnetized after being taken from the machine?

The written section of the examination on milling machines includes the following questions: (a) How many directions can the table on the machine be moved, and what are they? (b) How many lead screws are there on a horizontal or vertical mill (toolroom type), and what are they used for? (c) What other attachment on a vertical mill can supplement one of the lead screws? (d) What kind of a cutter can be used on either type of machine to supplement nearly any type of standard cutter? (e) What type of cutter would be used for slab milling; side or slot milling; angle milling? (f) What operations can be performed other than conventional milling on either horizontal or vertical mills? (g) What way can an angle be milled other





The School Equipment includes a Grinding Machine of each Type, and the Students Learn to Operate Each Machine as a Part of their Course

than by a conventional angle cutter? (h) What does concave; convex mean? Illustrate by sketch. (i) How many turns do you make on the index crank of the dividing head to make one complete turn of the head? How many degrees are covered with one turn of the crank handle? How many turns of the crank and holes in the index plate circle would be necessary to cut gears with 10 teeth? 8 teeth? 18 teeth? 32 teeth? 50 teeth?

In the written section of the examination on the operation of the shaper the following questions are asked: (a) What do you first do when material is on the machine and the cutter sharpened before starting the machine? (b) What is the purpose of layout lines on a job? (c) Why do you place the finished side of the work against the solid jaw of the vise? (d) When taking a vertical cut on the side of a job, in what position should the clapper box be in relation to the work? (e) How should a keyway be cut on a shaper when the keyway does not extend the

full length of the job? (f) What tools are most commonly used for checking work on the shaper? (g) Why is it always the best policy to have two sides of a job dead square before proceeding to completion? (h) Describe two methods of cutting an angle on the shaper. (i) How far should the stroke of the machine be set to clear the work in the machine, and why? (j) Test Job: Make a pair of identical vee blocks or an angle plate from a sketch, and write an order for the material needed.

In the lesson in Blue Print Reading, the student is given a sample print in one corner of which is a list of questions relating to the drawing that must be answered satisfactorily. In addition, a written examination is given containing the following questions: (a) What is the purpose of a blue print? (b) Name the four main items of information needed to make a part. (c) How many dimensions be expressed? (d) What are the three dimensions that tell the shape of the part? (e) What are the three views that show these di-





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MODERN MACHINE SHOP 131

May, 1945

SURFACE & CYLINDRICAL GRINDERS _____ HOURS		SHAPER _____ HOURS
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This is to Certify that \_\_\_\_\_ has satisfactorily completed the prescribed course of training and has passed the required examinations in Blueprint Reading, Shop Mathematics and Measuring Instruments and on each of the above specified machines.

In testimony whereof we have hereunto subscribed our names at Toronto this \_\_\_\_\_ day of \_\_\_\_\_ 19\_\_\_\_

_____ <small>CLASSROOM INSTRUCTOR</small>	_____ <small>SUPERVISOR</small>
_____ <small>TOOL ROOM SUPERINTENDENT</small>	_____ <small>WORKS MANAGER</small>

#### Diploma Issued to Graduates of John Inglis Trade School

and when is it used? (l) What five pieces of information are obtained from an assembly blue print? (m) What may be left out of an assembly view? (n) In a sectional assembly view, how can we determine different parts that are shown side by side? (o) In a sectional assembly view, what parts are not sectioned? (p) What ability must we develop in order to be able to read blue prints?

The course includes a number of other written and oral examinations, but those outlined above will suffice to afford a general idea of the manner in which the material is presented and the results that are expected. Many of the graduates have shown such proficiency

that they are now assigned to setting up jobs for the production workers; others are making tools of the smaller and lighter variety.

According to the plant officials, it has been interesting to note the manner in which the interest of each student increases as she passes from one phase of her training to the next. As a matter of fact, many of the graduates take "refresher" courses occasionally in order to maintain their skill. A refresher course has been set up consisting of approximately 300 especially intricate problems, 10 of which are allotted at a time to those who ask for them. The student works on these problems on her own time.

# CONTINUOUS DRILLING HERE

## The Machine moves from Job to Job!

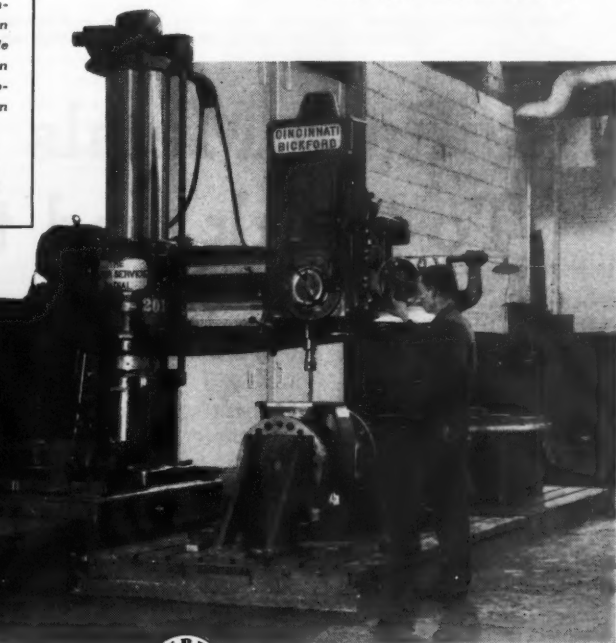


Heavy internal ribs give unusual stiffness to the column trunk. A flange of double thickness anchors the column to the base. These proper proportions give maximum strength.

Equal Efficiency of Every Unit Makes the Balanced Machine.

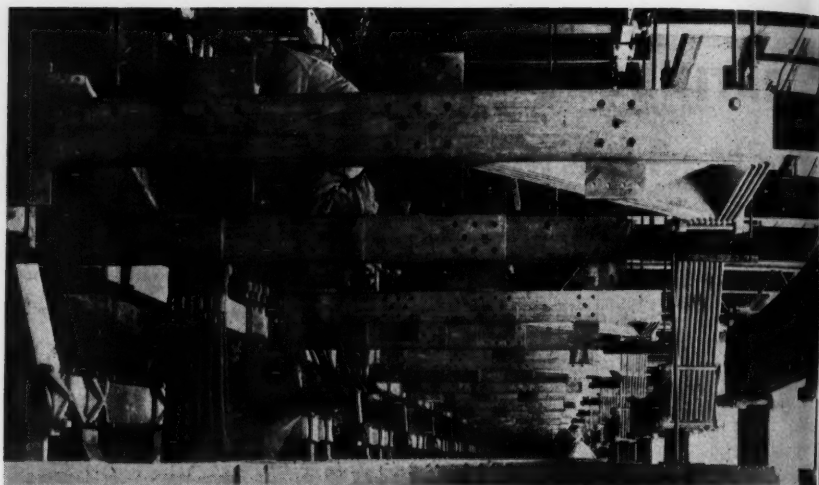
The low physical effort required of the operator on this Super Service Radial Drill and the accessibility of its controls contribute much to a maximum output. The use of the sliding base and a helper to set up work while the drill is in operation, give practically continuous drilling. Freedom from trouble and easy handling are necessities on production jobs.

Write for Bulletin R-24-A



**THE CINCINNATI BICKFORD TOOL CO.** Cincinnati 9, Ohio U.S.A.

MODERN MACHINE SHOP 133



View showing workmen installing silver bus bars in a magnesium reduction plant.  
(Illustration courtesy Dow Magnesium Corporation.)

# The Rare Metals Go To Work and to War

By H. A. BOLZ

Associate Professor of Mechanical Engineering  
Purdue University

**T**HE unprecedented and relentless demand for better equipment by our armed forces has led engineers and scientists to study very carefully the potentialities of all known chemical elements. As a result, many of our most precious metals are being put to work side by side with their commonest relatives. Elements which, in some cases, were considered merely as laboratory curiosities a few decades ago are now actual production materials, improving the range and accuracy of our guns, lengthening the life of ordnance instruments and boosting the

speed and maneuverability of our planes. Such elements, a number of which are described in the following paragraphs, are revolutionizing many of our design methods and production processes.

Most of the information available concerning the rare and precious metals is not new. The new uses inspired by the war cannot be published for security reasons. However, a familiarity with the known properties and characteristics of our less common elements by all engineers and production men will lead to quicker and more ef-

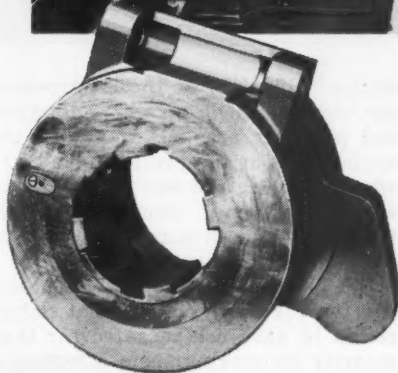
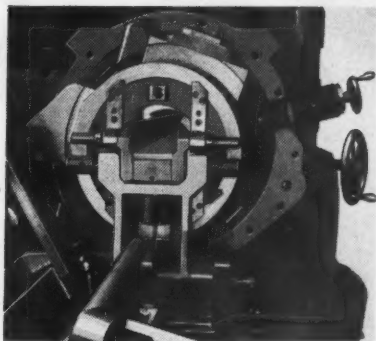


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Speed—speed in production—is a prime factor in the manufacture of big guns to keep our far-flung battlefronts ablaze. "More guns in a hurry" has been a constant demand from all parts of the world.

A high rate of production—plus fine finish and absolute accuracy—has been attained by *American* engineers in designing equipment for broaching lock step slots in 8" howitzer breech rings. The setup makes use of two *American* H-60-72 horizontal broaching machines and eleven different broaches to accomplish this task.

Whether your production requires fast output, excellent finish, or accuracy to close tolerances, whether it involves the use of standard or special machinery, let *American* engineers recommend the correct broaching equipment to do the job. *American's* complete broaching service—machines, tools, and engineering—is at your disposal. Write for details today.



Slots in breech rings for 8" howitzers are broached on two *American* H-60-72 broaching machines, identical except for various broaches required for this operation. Top photo shows fixture which indexes the part one-quarter turn after each cut. Lower photo is of the finished part.

MAKES  
**BROACHING TOOL**  
INSTITUTE

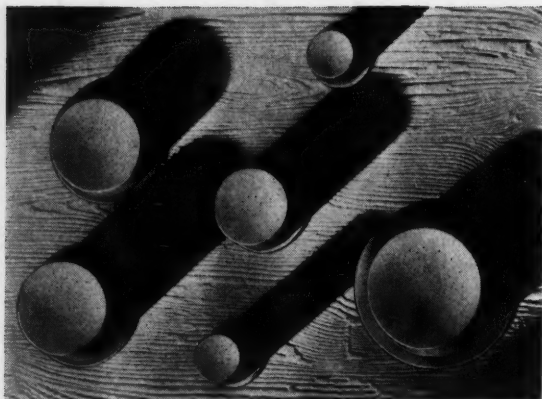
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For longer  
broach life  
keep broaches  
sharp.

Above: *American* H-60-72 broaching machine, used in broaching lock step slots in 8" howitzer breech rings. Turret holds five broaches and revolves after each four cuts to bring next broach in position for cutting. A similar set-up with six-broach revolving turret is used for completing the part.



Rayon Spinnerettes made of Gold Alloyed with Palladium or Platinum. (Photo courtesy Baker Company, Inc.)

fective utilization of these properties for the betterment of war equipment and post-war products. Many of the applications of the precious metals adopted during the war will be found worth continuing; others are merely temporary and, in some instances, uneconomical expedients.

The most interesting factor concerning the rare elements is that nature seems to have compensated for their scarcity by making them effective in exceedingly small amounts. Consequently, although they are not available in great quantities, they are important practically because they usually are required in only very small percentages. Their amazing effectiveness in these minute quantities cannot fail to inspire the imagination of

the practical man.

The metals listed below are grouped, in most cases according to their chemical relationships in the periodic table of elements.

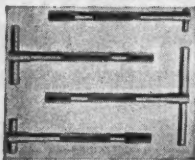
### Gold and Silver

While it has always been held in high esteem by man and still comes to mind first when one thinks of precious metals, gold does not satisfy the needs of industry as well as many of our rarer metals which will be discussed later. Its workability, appearance, resistance to corrosion and attack by strong chemicals and its proof against loss by fire are properties which were highly valued by the ancients. Its softness, weakness and heaviness, however, render it of little practical service in industry except in the alloy state.

The applications of various gold alloys in jewelry and dental work are well recognized. While less common, their industrial applications are growing rapidly in importance and interest.

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Set of 3 (A, B, C)		
w/case		7.30
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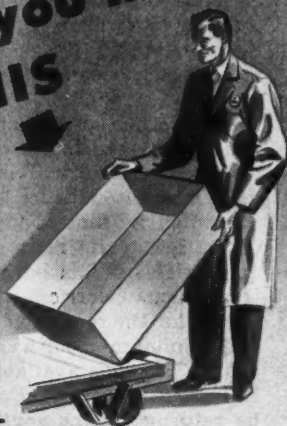
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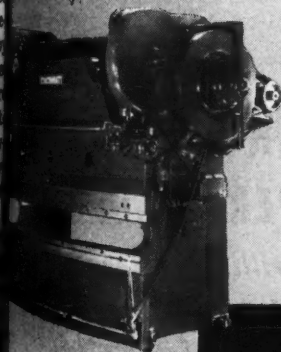
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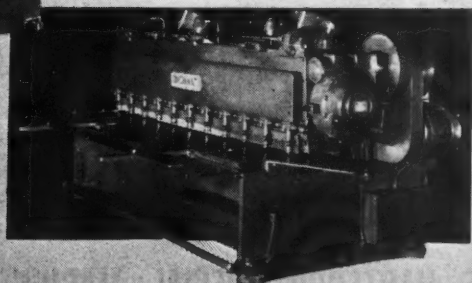


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Gold-silver alloys containing small percentages of platinum have been used widely for electrical contacts in telephone equipment where currents are light and where abrasion is involved. Gold alloyed with palladium or platinum is particularly resistant to acid corrosion and in these forms is used for chemical equipment—especially rayon spinnerets, the spider-type nozzles which eject liquid rayon in an acid bath to form our war-time "silk" thread.

Some of the newer gold alloys are showing promise of broad future applications. Indium combined with gold produces very hard, brittle alloys—too hard to be worked or machined but easily cast and polished. These metals may be plated alternately on a metal part and diffused by heating at 330 deg. F. to produce a highly wear-resistant surface. Gold-indium brazing solder has a sufficiently low melting point (930 deg. F.) to make it appli-

cable for brazing objects having glass inserts, with the additional advantage that its low vapor pressure prevents the clouding of the interior glass surfaces which occurs when zinc solder are used.

Silver is one so-called precious metal which has gone to war in a big way. Its excellent electrical conductivity and its relative abundance in the face of its ordinarily limited industrial application led to its being used in great quantities for bus bars to carry the tremendous electrical currents required for the reduction of magnesium and aluminum in our war plants. When copper becomes available again for this service, the silver, no doubt, will be returned to the government vaults from whence most of it came to do its share in the fight.

In like manner, silver is serving in the emergency to replace chromium, zinc, tin, lead, cadmium and nickel in electroplating and other services.



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*with Drilling Attachment*

The Hartford Super-Spacer can be provided with the above illustrated drilling attachment which may be quickly secured to the base. Ample adjustment is provided to make an ideal combination for drilling odd lots of flanges, hubs or other parts where spaced holes on a circle are required. It can also be adapted for large lot production. It will save in the cost of special jigs.

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\* Differs from illustration



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where these temporarily scarce metals cannot be used. As a result of such substitute service, it has been discovered that lead-silver solders are superior in creep strength to the ordinary lead-tin. This property may prove to be especially important on military and industrial equipment where utmost reliability is required of soldered connections subjected to continuous overload duty.

Silver linings for cooking vessels and containers in the food industry and pure silver bearings for airplane engines are just two thought-provoking uses for this versatile metal. Besides its well-known properties of malleability, ductility, and beauty, silver possesses the ability to resist attack by most food acids and has a high thermal conductivity; hence its application to commercial food preparation. As a bearing metal it stands up well under the mighty pounding and hot rubbing that takes place in high speed engines, serving especially well when combined with lead or cadmium.

Sterling silver, commonly used in jewelry, coinage and plate, contains copper to increase the hardness of the silver, which, in the pure state, is extremely soft. Silver salts find wide industrial applications; for example, the oxide is used to tint glass yellow and the nitrate is employed in marking inks and in photography.

## Lithium

Lithium, one of the rarer alkali metals and the lightest of all metals, is too soft and too chemically active to be of any practical use as a material of construction in its pure state. It is silvery white in appearance, but reacts readily with moist atmosphere and must be kept in airtight containers or submerged in kerosene.

Lithium possesses several interesting characteristics which have enabled engineers to put it to good use. First of all, it seems to have a very strong



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**Short Tool Life** and inferior finish were slowing production in a plant machining airplane gears. Several well-known cutting lubricants were used up to seven months ago. Then a Sun Cutting Oil Engineer stepped in, studied operating conditions and recommended Sunicut.

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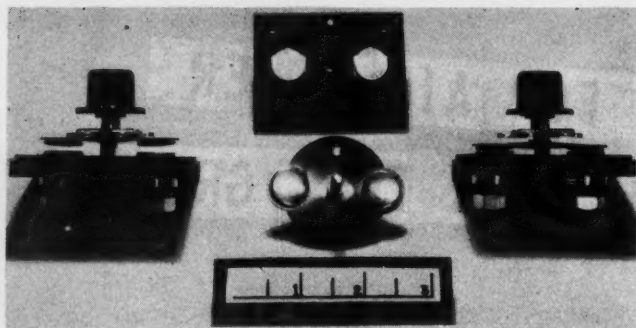
**Experiences of operators** of machine tools prove the production value of Sunicut — developed to make tools hold their edges longer, cut faster and produce better finishes. Put this transparent, free-flowing, sulphurized cutting lubricant to work in your shop. Write for details to...

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Motor Protection Thermostat. Control Buttons on Bimetallic Disc are Silver on Steel; Buttons on Block are Solid Silver. (Photo courtesy Spencer Thermostat Company.)

attraction for oxygen, nitrogen, hydrogen, sulphur, carbon oxides and silicates—all of which are troublesome to the foundryman and heat-treater. Lithium and lithium salts, consequently, are used as scavengers to remove these materials, which are found to contaminate metals in the casting and heat treating processes. Lithium also serves as a hardening and strengthening agent for aluminum, zinc, copper

Lithium-stearate greases are water resistant, and work equally well for our armed forces in the hot deserts and the Arctic. Lithium also serves in light-sensitive or photo-electric cells which are so widely used in production control equipment as well as military and naval instruments. The crimson flame produced by its salts in burning has long contributed to the beauty of peace-time pyrotechnic displays; now

and bearing metals. Certain of its salts are used in storage batteries to increase electrical capacity.



● The Almond Three Jaw Drill Chucks were the first to be placed on the market. They were Pioneers in the field of Drill Chucks!

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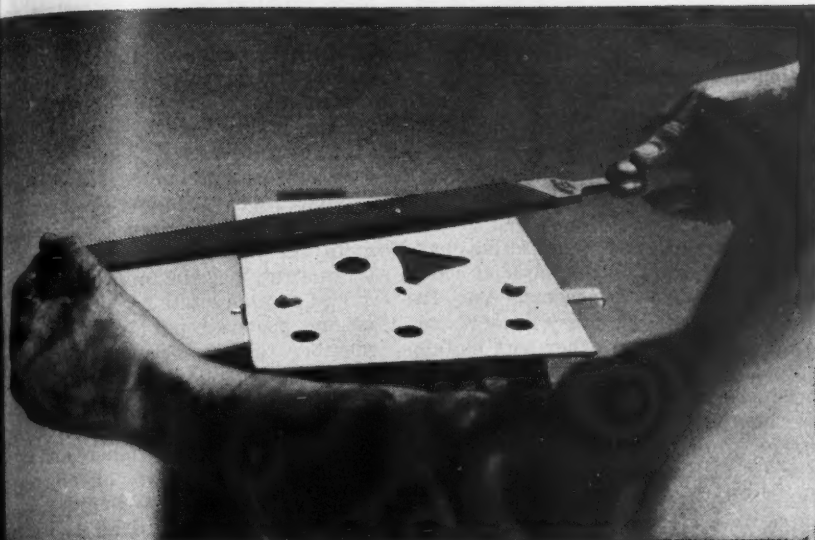
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it has gone to war in signal flares. Lithium, compared to its chemical relative, magnesium, works by the ounce rather than by the ton—but how those ounces do count!

### Indium, Thallium and Gallium

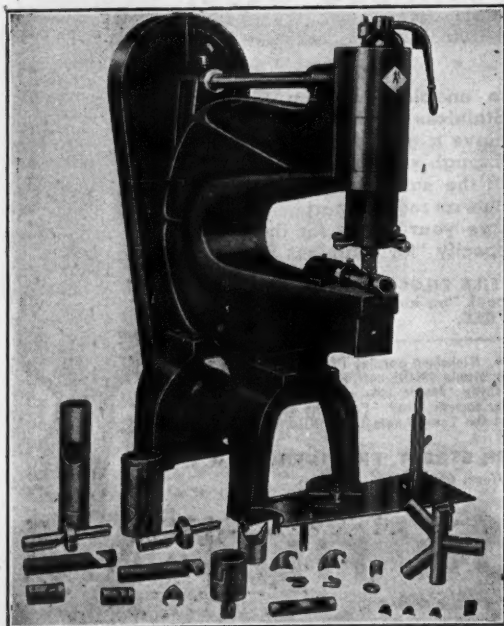
**Indium**, one of the rare heavy metals whose cost in the past has placed it in a class with the crown jewels of royalty, has a number of remarkable characteristics which have made it valuable for a variety of practical uses. Indium is a soft, "buttery" metal, but when diffused with other soft metals, such as tin, cadmium, lead and copper, produces a mixture which is much harder than either parent metal.

The compounding required to produce such diffused mixtures or solutions with indium is as follows: the indium is plated over the base metal, then "smeared" to improve the contact, and finally diffused with the base metal by baking in an oven. This treat-

ment, applied to bearing metals, decreases the friction, increases the resistance to mechanical wear and corrosion, and improves the final finish.

Its low melting point of 312 deg. F adapts indium to service in fusible alloys for safety plugs and in solders (see paragraph on gold). Its white, silver-like appearance and excellent corrosion resistance have made it an ideal metal for plated reflector surfaces. No large stretch of the imagination is required to appreciate the war-time value and post-war potentialities of this member of our great family of rare metals.

**Thallium**—a metal which is similar to lead in many of its properties but less stable in the atmosphere and much less abundant—offers an amazingly diversified number of everyday applications. Alloyed with lead it furnishes an electrode material which stands well in the electrolysis of highly acid solutions and so is used as a plating



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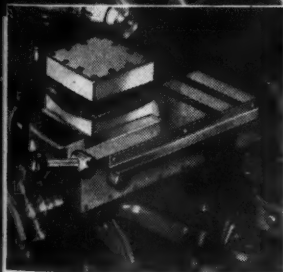
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The time-saving versatility which enables South Bend Lathes to handle so many exacting, precision operations in essential war industries will be a pertinent profit-making factor when normal production is resumed. The ease and speed with which the lathe can be changed from one set-up to another, and the special attachments available to broaden the range of work, save time and reduce labor costs for the plant that has a variety of lathe operations to perform.

South Bend Lathes have wide ranges of spindle speeds and power feeds. Full quick change gear mechanism permits instant selection of any thread cutting feed, power turning feed, or power facing feed. Convenient, quick acting controls and easy reading graduations contribute to smooth lathe operation and efficiency.

South Bend Engine Lathes and Toolroom Lathes are made in five sizes: 9", 10", 13", 14½", and 16" swings. Precision Turret Lathes are available in two sizes: ½" and 1" collect capacity. Write for new Catalog 100-D giving full descriptions of all lathes.

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material for many parts of chemical equipment. Other lead-thallium alloys serve as electrical fuses and high-temperature solders. (The melting point of thallium is about 576 deg. F.) An amalgam with 8½ per cent thallium is used in thermometer bulbs for low temperature measurement.

The salts of thallium play particularly important roles in war time. One such compound is used to protect leather and textiles from the ravages of jungle dampness, fungus and insects. Another, the sulphate, is a most effective, tasteless and odorless insecticide and vermin killer which fools even the wary rat. Metallic thallium and several of its compounds are added to engine fuels as a patented "anti-knock." Thallium crysulphide is comparable to selenium as a light sensitive material for photoelectric cells, more sensitive to long wavelength, low intensity light. Its response to infra-red rays adapts it to "dark signalling."

Gallium is one of the scarcest of the rare metals. It is widely distributed in nature but occurs in extremely small quantities. Although very few uses, especially industrial, have been found for this metal, it possesses several characteristics which may lead it to an active future. Gallium is of a greyish, steel-like color. It is somewhat malleable but, under hammering, rapidly becomes brittle. Its low melting point of about twelve degrees below the human body temperature has made it a good metal to use in thermometers of the quartz type for high temperature measurement.

Gallium is slowly dissolved in hydrochloric and nitric acids and is entirely unaffected by the atmosphere. In the molten state it adheres to glass and forms reflecting surfaces superior to those produced by mercury; hence it has found some application in fine optical mirrors. Its readiness to form amalgams with mercury, aluminum,



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THREAD AND FORM  
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cadmium, platinum and other metals and its chemical inactivity make it a good dental filling material. In addition to this array of distinguishing features, gallium claims the distinction of being one of two metals known to expand on solidifying (the other is bismuth).

If our experiences in adopting and developing other rare metals for industrial use are any criterion, it is safe to say that gallium has what it takes and will serve ultimately in many practical ways in spite of its present scarcity.

#### Cerium

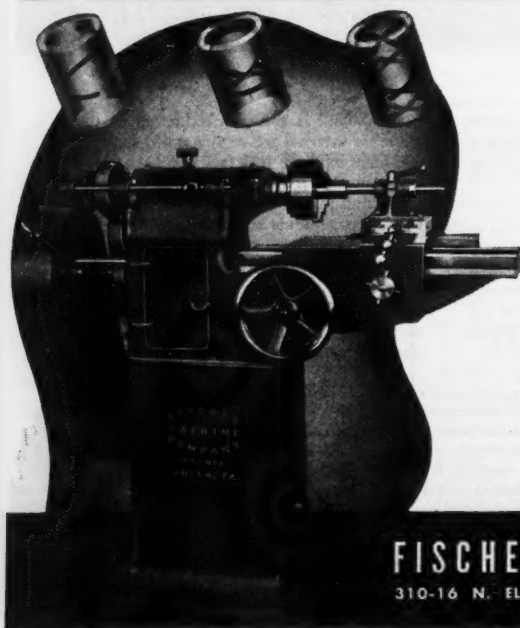
With every spark from the gas welder's torch lighter and from your cigarette lighter, too, for that matter, the metal cerium is put to work. Cerium, one of the rare earth metals, has long been used alloyed with iron to produce sparks for automatic gas lighters. It also serves in a pyrotechnic sort of

way in carbon electrodes for carbon lamps designed to produce chemically active or actinic rays for photo-engraving and similar service.

A more recently developed application of this strange metal, which is obtained from certain yellow sands found in Florida beaches, Brazil and India, is an alloying element to increase the fluidity of cast iron. Unlike phosphorus, which likewise improves fluidity and thus enables foundrymen to mold more delicate castings, cerium strengthens the iron and further improves it by removing some of its sulphur content. Considering that only two per cent cerium is required to produce this remarkable result, here is a rare metal with which we had better become more familiar.

#### Titanium, Zirconium and Thorium

Titanium occurs abundantly in nature but, because of the difficulty of separating it from its minerals, just-



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A wide variety of grooves may be cut on the "FISCHER" . . . with minimum set-up time and cost.

Bearing in which groove is to be cut is mounted on revolving chuck secured on work spindle. Boring tool is secured to carriage slide which has a reciprocating motion timed with work spindle and lined by crank gear and connecting rod.

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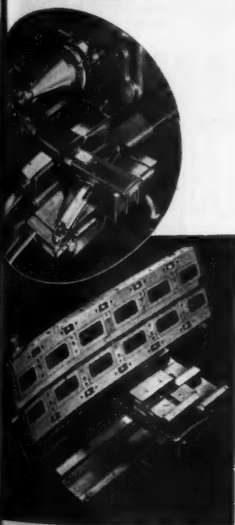
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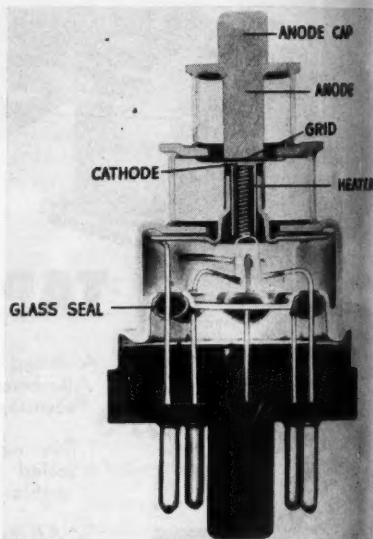
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fies being classified as a rare element. Titanium and zirconium are peculiar in that in some of their salts they act as metals while in certain other compounds they act as non-metals. Thorium, which is in the same chemical group as these two elements, is exclusively metallic.

Pure titanium is so hard that it will cut glass with ease. It is a silvery-white metal and has a particularly strong affinity for oxygen, hydrogen



Cross Sectional View showing Construction of One of the Newest War-Born Electron Tubes—the Megatron; a Combination of Glass and Precious Metals with Broad Wartime and Post War Applications. (Illustration courtesy General Electric Company.)

and carbon. As a result of this latter property, titanium, in the form of ferro-titanium and titanium-copper, is used to remove oxygen and other impurities, especially gaseous, from steel during manufacture.

As an additive to some alloy steels it improves tensile strength and hardness, taking the place to some extent of strategic vanadium in war-time tool

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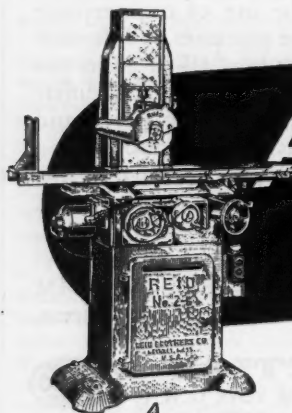
steels. Added to cast iron in small quantities in the molten state, it improves toughness by refining the grain size. The oxide form is used in white paints because it does not darken in sulphurous air as does white lead, and it also serves as a filler for white rubber goods and paper.

Titanium tetrachloride is a colorless liquid which forms dense white fumes in moist air and consequently is employed in smoke screens and skywriting. Titanium carbide is extremely hard and wear resistant and is used in the sintered form for metal-cutting tools, drawing dies, and so on. The ability of titanium like that of tungsten and tantalum-carbides, to maintain its hardness at elevated temperatures makes it particularly adaptable to high speed cutting.

Zirconium has some of the most interesting and speculative war-time applications of all the rare metals. As a metal it is added to steel and nickel-

copper alloys to improve hardenability, machinability, and high-temperature properties. Its energetic reaction under high temperatures with all elements but the rare gases makes it an essential component in all vacuum tubes for electronic equipment; it acts as a "getter" to absorb any traces of air or other matter left in the tube by imperfect evacuation or generated during operation of the tube. It is sprayed on the tube plates to put it in the best spot for this job.

Zirconium's superior corrosion-resistance and heat-transmission properties grant it an undisputed place in heat exchangers for the evaporation of hydrochloric acid—a fighting chemical to handle during war or peace. Zirconium powder is used in blasting caps and other explosives. The oxide of zirconium has a melting point of almost 6000 deg. F. and because of this is used as a refractory material for furnace linings, firebricks, and refractory ce-



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ment and crucibles for melting quartz.

**Thorium**, like its relatives titanium and zirconium, is considered rare, although not scarce, because of the difficulties involved in isolating it. It, too, is strongly attracted to oxygen, and this factor, combined with its high melting point of about 5500 deg. F., has made it practically unobtainable in the pure state. Thorium oxide, when heated strongly, emits a brilliant white light—it is the stuff of which incandescent gas mantels are made.

Certain other thorium compounds are used in flashlight powders and flares. All thorium salts are radio-active, which means that, like radium, they emit radiations of a special character which are able to penetrate matter opaque to ordinary light. Certain thorium compounds are used in place of more expensive radium where their shorter radio-active life is acceptable.

Thorium, added in small percentages

to the tungsten of which electronic cathodes are made, increases rather markedly the rate of electron emission and gives it a prominent place in the booming field of electronics. Improvements in the economy of reducing thorium to its pure state are greatly needed if engineers are to take full advantage of the versatile element.

*(The concluding section of this article will be published in the June issue of this magazine.)*

**Mallory Resistance Welding Electrodes and Alloys** are the subject of a 32-page catalog issued by P. R. Mallory and Co., Inc., Indianapolis 6, Ind. The catalog lists the company's complete line of standard spot-welding electrodes and water-cooled holders and presents a listing of "do's and don'ts" for improved resistance welding. In addition, stock sizes of Mallory Alloys, and various applications and typical physical properties are covered.

Copy to catalog is available to executives addressing requests on their company letterheads.

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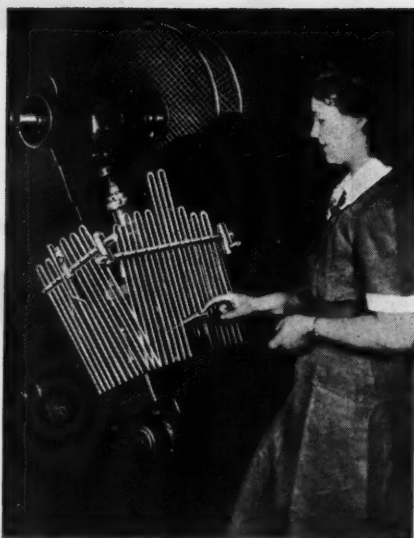
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- Safe, convenient storage
- Visibility and ease in racking
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- Re-use of containers for many purposes

WRITE FOR SMALL TEST SAMPLE  
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in plastic container.



*We fit the file to the job*

THE ROTARY FILE CO., INC.  
STRATFORD, CONN.



Enclosure type of die in use on punch press. Note that this guard is adjustable in all directions, so that it can be set fairly close to any rectangular die regardless of its dimensions. Note also the manner in which two of the adjustable "staples" at the front have been set just high enough to clear the feed chute to the die. (Photo courtesy Strand Manfg. Co., Chicago, Ill.)

In this, the concluding section of the article, the author presents a number of devices for guarding power presses.

# Safety is Good Business, II

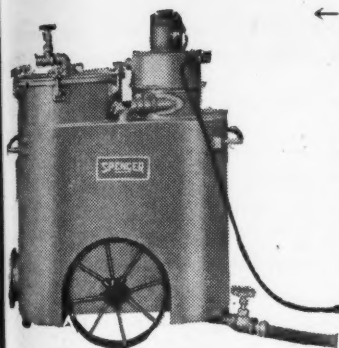
By JOHN E. HYLER

**A**MONG the safety devices for grinding wheels that have been developed more recently is an enclosure guard that can be pivoted or rotated to any desired position on the machine spindle housing, so that the opening in the guard can be brought to working position on the periphery of the wheel. Such a guard is frequently used on bench grinders of the type used on maintenance and similar work. A guard of this type offers the advantage of convenience in getting at the wheel in the most convenient manner to grind work that otherwise would be extremely awkward to handle. It is also provided with means for adjustment whereby it can be fitted

to the periphery of the wheel at intervals until the wheel has been worn beyond further use.

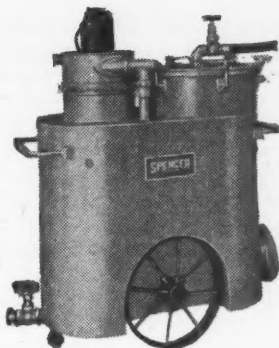
In past years cases have been noted where chuck guards on internal grinders have been fitted with automatic opening and closing devices. Where side-loading fixtures are used, a great deal of extra handling time has frequently been used, due to the necessity for opening and closing such chuck guards. In one case, however, where an internal grinder of well-known make was used, the manufacturer of the machine worked out means for operating the chuck guard automatically.

Springs were fitted to the chuck



← Pick-up position: Suction hose on intake at swivel connection—Two way valve open—slide valve in—three way valve open to atmosphere.

Discharge position: Pressure in tank—hose on drain valve—two way valve closed—slide valve out closing intake to vacuum producer and opening ports to allow air to be drawn into vacuum producer from outside—three way valve closed delivering air into tank under pressure.



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drain valve, liquid can be discharged under approximately 3 lbs. pressure. This permits raising the liquid to a height of 6 ft., emptying the tank into a drum or other container for easy disposal.

No priming is necessary—and all material in the sump tank is cleaned out by air vacuum after the liquid is removed.

Sizes  $\frac{3}{4}$  or  $1\frac{1}{2}$  horsepower, universal or single phase motors, 25 to 60 cycles, 110 or 220 volts or d.c.;  $12\frac{1}{2}$  foot vacuum hose lengths and 50 foot cable extension. Ask for the bulletin.

## SPENCER VACUUM CLEANING

THE SPENCER TURBINE COMPANY, HARTFORD 6, CONN.

285A

May, 1945

MODERN MACHINE SHOP

161

guard in such manner that they tended to throw the guard open, but a hydraulic cylinder was fitted to the back of the guard so that oil pressure in cylinder would hold the guard closed against the pressure of the springs. The cylinder receives its oil through a valve with a plunger-type stem, the valve being located so that the plunger can be depressed, by means of a cam mounted on the edge of the sliding grinder table, against the resistance of a spring contained in the plunger.

As the table carrying the grinding wheel is run out to "rest" position, the cam depresses the valve stem and allows the oil to drain out of the cylinder whereupon the springs connected to the guard act to throw it open. As the grinding wheel is fed back toward the newly-mounted workpiece in the chuck, the cam disengages from the valve plunger and permits the valve spring to lift the plunger, thus allowing oil to flow from the pump

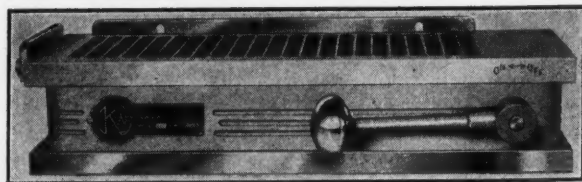
into the cylinder and closing the chuck guard against the resistance of the springs.

This principle can be applied to automatic and intermittent guarding in similar manner, using either hydraulic or pneumatic cylinders and mechanically-actuated valves, solenoid-operated valves, and similar mechanisms.

#### Guarding Power Presses

The toll of human hands and fingers taken by power presses has been greatly reduced in recent years due to a growing realization on the part of both management and employees that the fullest utilization of all available safety measures is highly profitable to both—from any and every standpoint. A careful study of the hazards involved should be made, and every effort should be made to discover and apply such safety devices as seem best adapted to the various types of equipment and materials.

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**Hold Work Tight**  
**Generate No Heat**

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**Release Easily**  
**Used Wet or Dry**  
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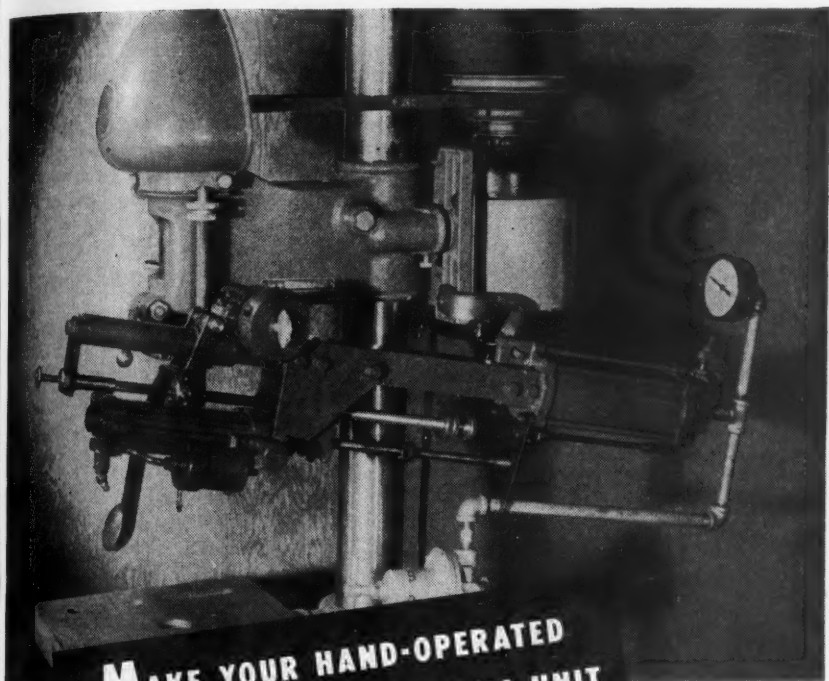
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May, 196



## MAKE YOUR HAND-OPERATED DRILL PRESS AN AUTOMATIC UNIT

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CC-60—6" stroke Hydro-check

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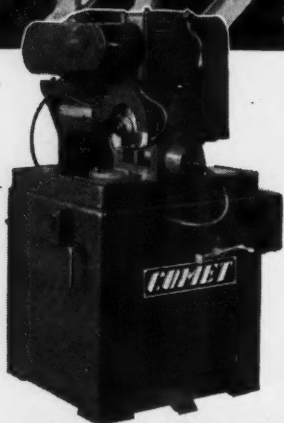
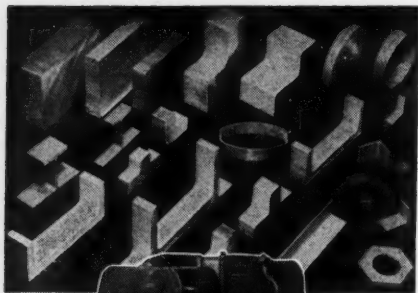
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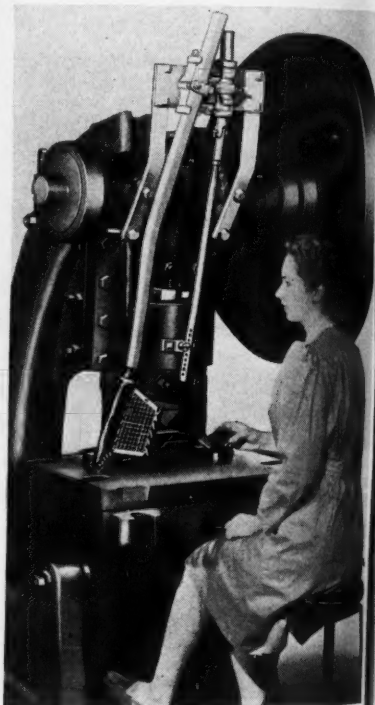
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MODEL MH

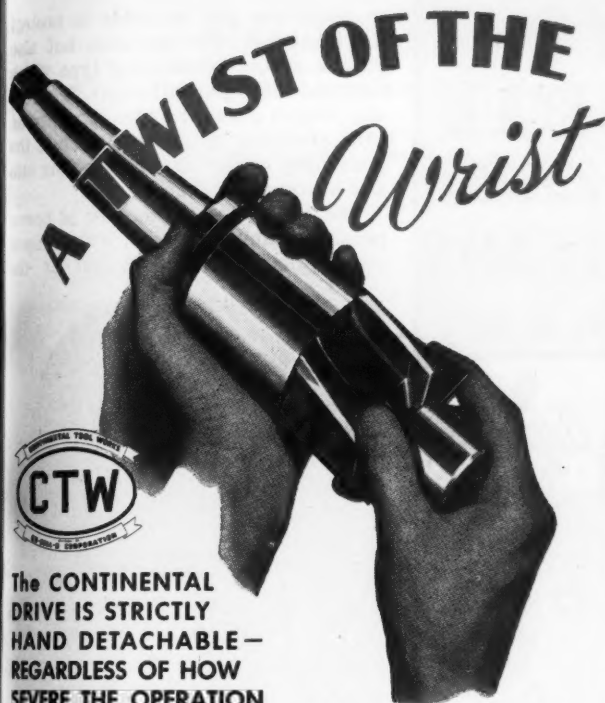
Some attention has been given to the guarding of press flywheels, but most of the effort has consistently been centered on protection at the point of operation. Any man or woman operator may become absent-minded now and then, with disastrous results. Even guide pins on dies need



Sweep type of guard in use on a punch press. This guard has a swinging arm that is actuated by the press ram as it starts downward, pushing the operator's hands to one side if they are in the danger zone. (Photo courtesy Standard Manfg. Co., Chicago, Ill.)

to be covered in such manner that there is no gap between the pin and the bushing when the ram is at the top of its travel. Devices for guarding die pins are now available, including not only covers which are designed

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**THE CONTINENTAL  
DRIVE IS STRICTLY  
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REGARDLESS OF HOW  
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With an ever-widening range of practical uses, the Continental Counterbore is proving a favorite standard cutting tool in all types and sizes of machine shops. Of rigid and simple construction, with patented features, it has long been outstanding in American industry. There's a reason: Note in illustration at left the

Continental indestructible drive. It is composed of two driving lugs formed on the cutter shank, with two corresponding abutments on the inside of the holder. There is an aligning bearing above and below the driving lugs that brings the cutter and holder concentric, and prevents the cutter from being forced out of alignment. The cutter and holder are engaged and disengaged by revolving the cutter a quarter turn by hand. No tools or equipment are necessary.

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- High Speed Steel Reamers
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- Flat Form Tools
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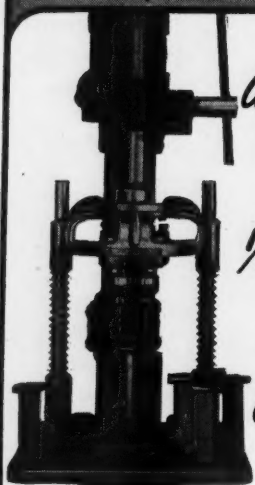
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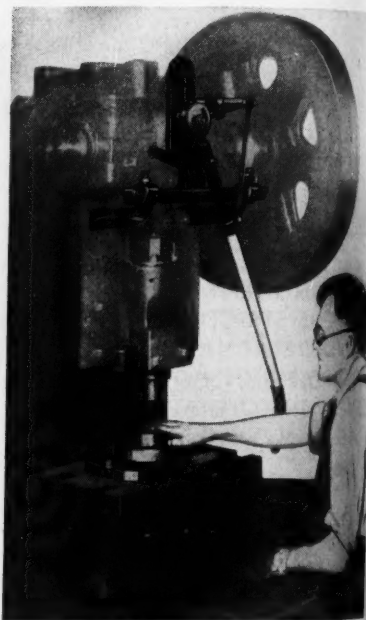
## LINDERME

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to cover the gap in order to protect the hands of the operator, but also guards of the telescoping type which eliminate the gap entirely. Telescoping guards cover the pins at all times thus affording protection against the possibility of dirt or scrap getting into the bushings.

The most effective method of power press guarding, however, is based upon the principle of protection at the



Punch Press Guard of the Sweep Arm Type which Pushes the Hands of the Operator Aside—if They are Encountered—as the Press Ram Descends. (Illustration Courtesy Standard Safety Equipment Co., Chicago, Ill.)

point of operation. Such protection takes the form of automatically-operated mechanisms of various types that are designed to make it impossible for an operator's hands to be within the danger zone when the press ram is descending. In some cases special adjustable die guards are used which actually fence the dies in, making it

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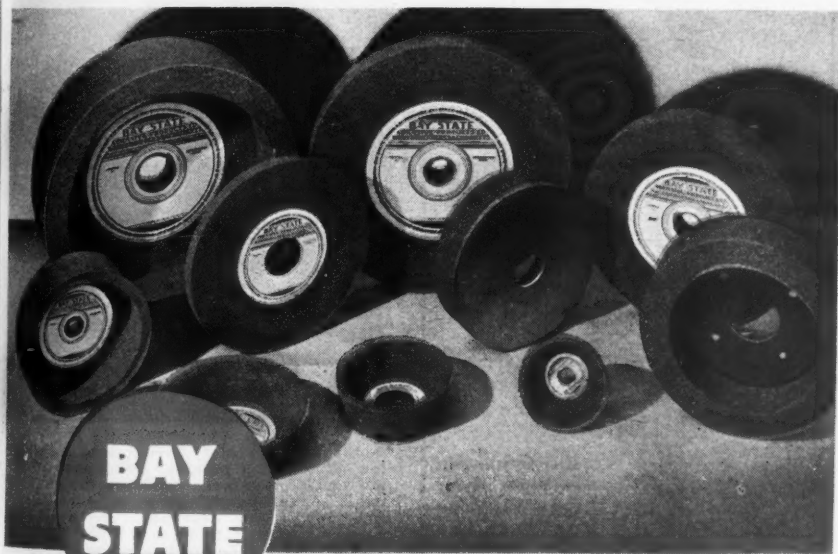
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May, 1945

MODERN MACHINE SHOP 167

practically impossible for an operator to get his hands into the danger zone when the machine is operating. In others, the downward motion of the ram itself is utilized to operate a mechanism that forcibly removes the operator's hands from the vicinity of the dies at the instant of operation.

### Mechanical Hand Withdrawal Apparatus

Among the several types of devices

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that mechanically and positively remove the hands of the operator from the danger zone as the press ram descends is the laterally-swinging arm which is actuated by the downward

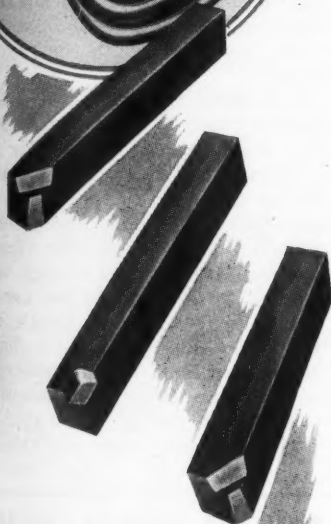
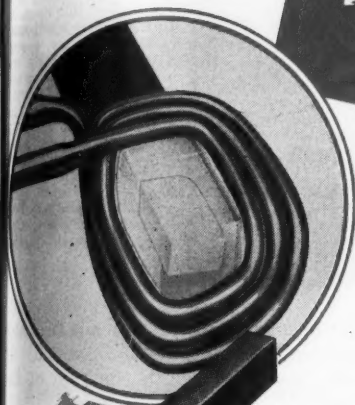


Shown here is a safety device, used in connection with punch presses, embossing presses and similar machines, which literally pulls the hands of the operator back out of the danger zone as the ram descends. The downward movement of the rod attached to the press ram is multiplied by the mechanism just above the press, so that the pull-back motion on the cable is faster and greater. In the instance shown the device is supported from the floor, but in some cases the mechanism is supported from the ceiling instead. (Photo courtesy Positive Safety Mfg. Co., Cleveland, Ohio and Standard Safety Equipment Company, Chicago, Ill.)

motion of the press ram through a system of linkage. As the ram begins its descent, the arm is mechan-



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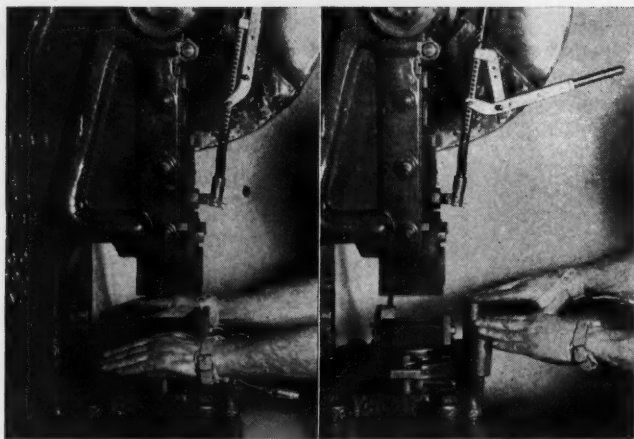
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In the illustration on the left the hands of the operator are shown in the danger zone, just before the action of the pull-back device begins. Note that snaps at the cable ends are snapped into rings of the leather wristbands worn by the operator. At the right the illustration shows the press just after the ram has begun its descent and the pull-back cables have pulled the operator's hands entirely clear of the danger zone. (Photos courtesy Protective Safety Mfg. Co., Cleveland, Ohio)

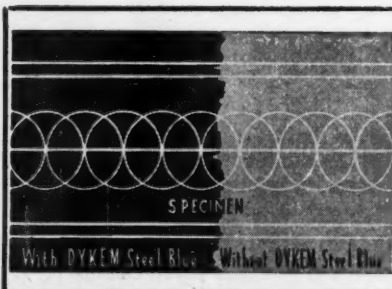
ally swept across in front of the die; thus the operator's hand, if in the danger zone, will positively be thrust aside and out of danger. This type of press guard is available from several different manufacturers, in a variety of designs.

Another mechanical hand-removing device actually pulls both of the operator's hands straight back, out of the danger area, if he has not removed them from the danger area of his own accord. In this case, the operator wears wristlets which are provided with rings to accommodate snaps on the ends of two light steel cables. These cables merge into a single cable which passes up back of the operator and over a sheave at the top of a sup-

porting standard, and thence to a motion-multiplying device which, in turn, is connected to the ram of the press.

The motion-multiplier is so designed that a slight downward movement of the press ram imparts a far greater pull-back motion to the cable attached to the operator's wrists, thus making sure that his hands are pulled completely out of the danger area before the ram descends far enough to injure them. In addition to the use of this safety device on punch, toggle, embossing the kick presses, it has been found excellent for the protection of workers' hands on drop hammers.

Another type of guard that is used extensively on press operation is the



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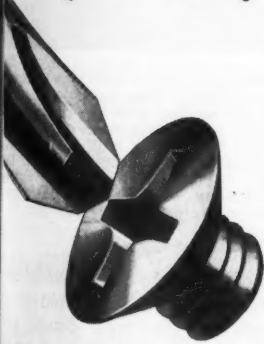
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barrier gate, which drops between the worker and die at the moment of press operation. The design of this guard includes a mechanical interlock between the gate and the press operating mechanism which makes it impossible for the press to be tripped or the ram to descend until the barrier gate has been released and allowed to drop all of the way down, into a fully protective position.

If the gate, which is relatively light

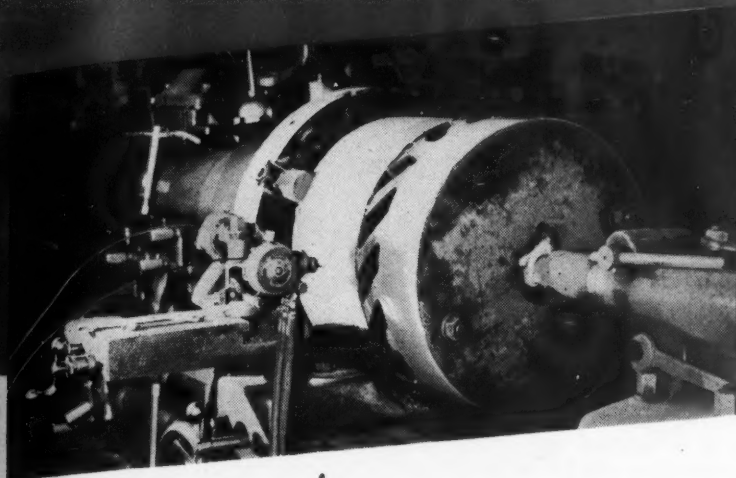


Press equipped with barrier gate type of punch press safety device. The press cannot be tripped until the barrier gate has dropped all the way down, and the barrier gate cannot drop all of the way down until the operator has removed her hands completely from the danger zone. (Photo courtesy Junkin Safety Appliance Company, Inc., Louisville, Ky., and Standard Safety Equipment Co., Chicago, Ill.)

in weight, drops onto the hand of the operator and is thus prevented from dropping all of the way down, the press mechanism is prevented from operating and cannot operate until the hand has been withdrawn from the operating zone. This guard also prevents the press from "repeating" if the operator absent-mindedly "rides" the pedal or forgets to remove his foot.

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May, 1945

MODERN MACHINE SHOP 173



Another view of the barrier gate type safety device. The device may also be used as a stationary barrier when it is desired to use it as a spout or dial lever. Here it is shown in use with a strip bar. (Photo courtesy Inkin Safety Appliances Company, Louisville, Ky., and Standard Safety Equipment Co., Chicago, Ill.)

If the foot pressure is not removed, the pedal rod is automatically detached and the barrier gate is automatically moved back to its top position where it is latched and interlocked. Thus protection is afforded to the operator against his own negligence.

Many special types of guards and safety devices for application power presses have been developed to meet the needs of special conditions. One of these is an interlocking type of mechanism which has been called a "two-hand" safety device. It takes its name from the fact that two levers are provided for the two hands of the

operator, and both two hands must be on these levers before he can operate the press, thus ensuring that his

hands are out of the danger zone. Also, guards are available of the drop-guard type, which utilize compressed air for operation. In some cases both the guard and the press are operated by compressed air.

**"Hot Work Tool Steels."** A bulletin containing complete information on the application, composition, and treatment of Crucible Hot Work Tool Steels in iron and steel, aluminum and zinc, copper alloys, and shell forgings has been prepared by the Crucible Steel Company of America, 405 Lexington Ave., New York 17, N. Y. Copy of Tool Steel Bulletin No. 6 Revised free upon request.

## Produce with SAFETY!

It pays to protect your operators by equipping your punch presses with

### STRAND Enclosure Safeguards

Easily installed. Adjustable to any size die. Quickly changed for any set-up. Write for circular.

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SAFETY ENGINEERS

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by Air!*

## **SPEEDY AIR VISE**

**GRIPPING FORCE 15 TIMES AIR LINE PRESSURE!**

America's war plants are switching to new, powerful Speedy Air Vises! From a single vise . . . to an installation of fifty . . . they are saving time, effort and labor costs! Air operated, *foot controlled*—both hands are left free for more rapid drilling, tapping, light milling, assembly, etc. **\$24** Complete with Foot Control Valve, Air Hose and Fittings, only

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### **AIR REGULATOR**

Precision - built.  
Delivers pressures  
up to 140 lbs. With  
gauge, \$4.  
Less gauge,  
\$2.50



### **AIR FILTER**

Keeps water  
and particles  
out of the  
regulator and  
pneumatic  
tools. \$1.50

### **BLOW-GUN**

Looks and  
operates  
like a gun. Ideal for  
cleaning and blowing  
out chips, dust, filings,  
scraps, etc. . . \$2.50



**W. R. BROWN CORP., 5725 ARMITAGE AVE., CHICAGO 39, ILL.**



By Using a Porcelain  
It is Possible to Measure  
the Actual Volume of  
Pore Space in a Grinding  
Wheel

By

HENRY R. POWER

The Carborundum  
Company, Niagara  
Falls, N. Y.

# The Composition of Abrasive Products

In this article the author describes a method for critically examining the physical structure of abrasive compositions

**S**OLID abrasive products, such as grinding wheels, are made up of a rather complicated composition of matter containing—as they do—three ingredients: (1) abrasive particles, (2) bonds and (3) spaces or pores. And one of these, or all three, may appear to be varied quantitatively within wide limits, and two of them—the bond and grit—can run the gamut of chemical and physical properties possessed by solid bodies generally.

The composition is limited, however, by practical considerations. For instance, a wheel must contain enough abrasive to be classed as a grinding wheel; the hardness of the abrasive must be 9 or 10 on Moh's scale; the bond must be of sufficient strength and of sufficient quantity to hold the abrasive particles together under operating conditions; the bond must not be so strong as to prevent the breakdown of the wheel gradually in use.



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## WRITE FOR YOUR COPY TODAY

The complete line of Ford Carbide Cutters is described and illustrated in this new 4-page bulletin. All standard styles and sizes are listed, as well as a selective few Carbide Specials which have been made to customer specifications.

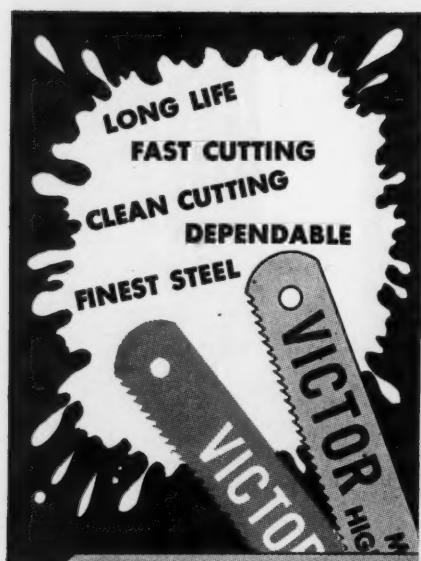
Carbides enjoy the distinct advantages of faster cutting speeds, greatly increased tool life, with proportionately fewer regrinds, lower tool inventory, maximum production economy. In actual test they have been shown to outlast ordinary high speed steel by a ratio of fifty to one.

If you are interested in attaining these advantages, write for your copy today.

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**744 W. FIRST ST. • DAVENPORT, IOWA**

**AND CUT FILES • GROUND FROM SOLID CUTTERS • CARBIDE CUTTERS**

MODERN MACHINE SHOP 181



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**VICTOR HACK SAW BLADES**



Complete metal cutting instructions are given in this **FREE VICTOR Metal Cutting Handbook**. Send for a copy today.

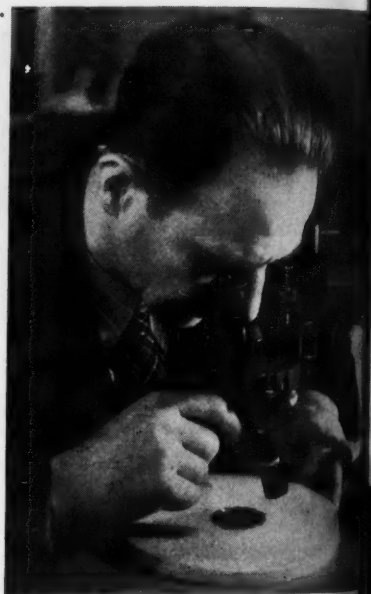
**VICTOR**

VICTOR SAW WORKS, INC.  
MIDDLETOWN, N. Y.

Makers of hand and power hack saw blades, frames and metal cutting band saw blades.

The type of abrasive generally used is silicon carbide and electrically fused alumina, both of which are products of the electric furnace. The sizes of the particles used may be as coarse as 4 mesh, or as fine as the sub-sieve sizes that are measured in terms of microns (0.001 millimeter) or mixtures of several grits.

Grinding wheels intended for finishing have been graded according to



The Structure of the Grinding Wheel is Determined by Examination with a High-Power Binocular Microscope

hardness, or resistance to a grinding tool worked by hand or by machine into it, and this resistance is taken as an index of the relative strength of the bond that holds the abrasive particles together. It has no relation to the hardness of the particular abrasive used in the piece. The hardness of the wheel alone cannot be depended upon as a qualification, because the relation of the grit par-

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TAKE A "WORK'S-EYE VIEW"



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May, 1945



See the length of these chips. Here's proof for you . . . the best kind of proof . . . that Morse Drills are accurately ground, uniformly angled, and have just the right amount of lip clearance. Try them! They'll cut down work and tool spoilage . . . reduce down-time . . . *make a noticeable difference* in your production costs!

TO REDUCE COSTS, SPECIFY MORSE CUTTING TOOLS

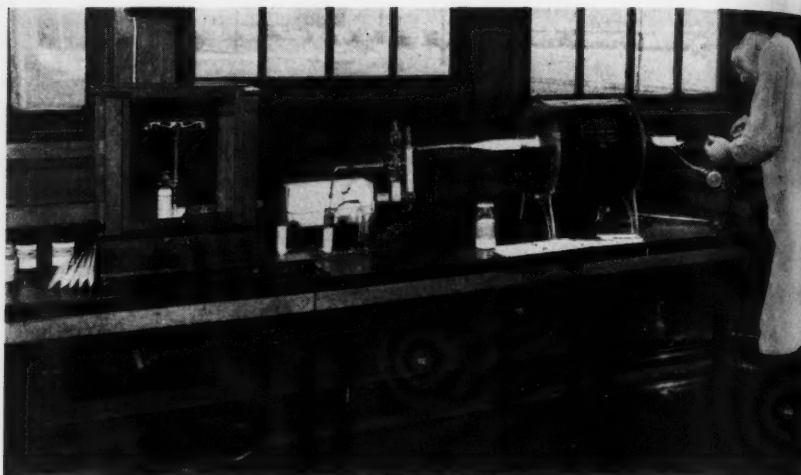
**MORSE**

**THERE IS A  
DIFFERENCE**

**TWIST DRILL AND  
MACHINE COMPANY**  
NEW BEDFORD, MASS., U. S. A.

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MODERN MACHINE SHOP 183



Laboratory Control of Both Abrasives and Bonds—Feldspar, Clay, Shellac, Rubber, and Resin—is Exercised to Maintain Uniformity of Grinding Wheels

ticles to the spacing or size of the pores can vary with one and the same bond strength, and the variations in the sizes of the pores has a bearing on the performance of the wheel in service. The percentage of abrasive and the percentage of bond contained in the wheel are important factors. Generally, the higher the bond content, the harder the grade of the wheel.

The determination of porosity or total pore volume tells much about an abrasive composition, but it doesn't tell the whole story of the

pores because two structures can be of like porosity although one has large pores and the other small pores. In such a case the grain spacing differs, and this difference becomes apparent when the grinding wheel is put into service.

It is evident that, for duplication in grinding wheel production, the amount of bond and grit used must not only be duplicated by weight, but they must also appear in the final product in the same structural relationship; i. e., the number and size of the pores must also be duplicated



# HINGES

**VARIOUS WIDTHS  
and GAUGES**



**BUTTS AND  
CONTINUOUS LENGTHS**

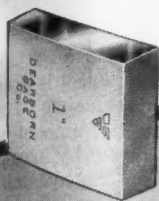
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## S & S MACHINE WORKS

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**GUARDS  
CABINETS  
CASES  
BOXES**





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Take advantage of Dearborn Gage Company's complete inspection service for all types of gage blocks. Just send your gages to us and they will be inspected immediately and returned to you within 10 days from the time received by us.

Accurate calibrations are made (after the removal of high spots or burrs) in our temperature controlled inspection room, at 68 degrees Fahrenheit.

Where gage blocks are not badly worn and a more complete calibration is required, end and center measurements are made on rectangular type gage blocks and at the center of each side of square blocks.

## CHARGES

2 types of inspection now available.

### THE "W" (OR WORKING) CHECK:

Twenty five cents for each block smaller than one inch and twenty five cents for each additional inch or fraction thereof.

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Fifty cents for each block smaller than one inch.

Fifty cents per inch of block or fraction thereof of longer blocks.

## REPLACEMENTS

When you send in your gage blocks for inspection it is very practical to give us specific instructions to replace any of your gages which we find to be worn beyond a certain tolerance. This specific tolerance is, of course, to be determined by you. You may also wish us to replace certain gages which have become damaged in some manner.

DEARBORN GAGE COMPANY  
Certificate of Inspection

Nominal Size	Actual Size	Tolerance
1.0000	1.0000	±.0001
1.0001	1.0001	±.0001
1.0002	1.0002	±.0001
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1.0097	1.0097	±.0001
1.0098	1.0098	±.0001
1.0099	1.0099	±.0001
1.0100	1.0100	±.0001

Reproduced above is a sample of a certificate of inspection, stating the specified size of each block measured and the actual measurement or variation from nominal size.



**DEARBORN GAGE CO. 22035 BEECH STREET DEARBORN, MICHIGAN**

*Originators of Chromium Plated Gage Blocks*

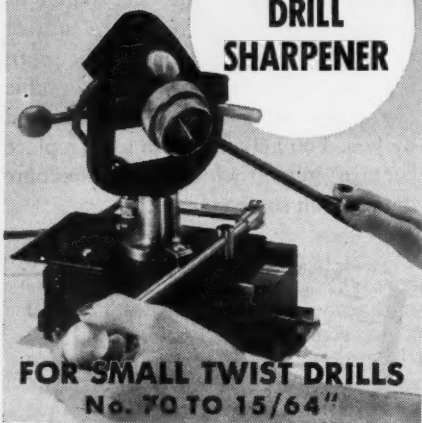
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FOR SMALL TWIST DRILLS  
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grinds small drills from No. 70 to 15/64" speedily and economically. Magnified visual alignment eliminates guesswork in indexing. An inexperienced operator can grind uniform, perfect drills after a few minutes instruction.

Each size drill requires a different bushing and 10 bushings of your size choice are supplied with each sharpener. Write for folder.

**\$134<sup>50</sup>**  
With 10 Bushings

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The shaping of grit and bond into the form of a grinding wheel is done under compression in a mould. For non-critical structures the amount of compression is measured by means of a gauge attached to the hydraulic system of the press. One class of wheels may be shaped at a pressure of 550 pound per square inch, another at 1,000 pounds, another at 1500, and so on.

In the other method of compression, the materials are compressed to a precalculated volume, regardless of the pressure exerted per square inch. This is accomplished by the use of a special mould which is built so that it shuts off the pressure when the required volume has been obtained. For any one grit-mix, therefore, the duplication of volume-structure is simple. It is interesting to note that changes from a long range of grit sizes to a simpler grit mixture in which the bond and grit are held constant may require as high as 900 pounds additional pressure to secure a formed piece of the specified volume. (Jour. American Ceramic Society, 1938, p. 235.)

After the carefully-prepared abrasive piece has been bonded and fired (baked), the final test is, of course, the behaviour of the piece in service. However, the arrangement of the pores or the actual structure of the wheel may be examined by the passage of air or gas through the composition under controlled conditions, at the same time measuring its rate of flow. Large pores will permit a fairly rapid flow of gas or air, while such flow will be impeded by finer pores. The rate of flow of gas through such a body is accepted as an index to its permeability, and is termed such for accurately rating the structure of a abrasive compositions where such structure is important.

The determination of permeability as applied to abrasive composition is

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May, 1945



## You can't find it all in books!

**G**RINDING has become an exact science. And so, much of the standard information users of abrasives need to specify the right abrasive for the job can be found in the books—notably "GRINDING FACTS" by "CARBORUNDUM." Nevertheless, industrial grinding techniques advance so fast these days, the books can't quite keep up. If you have an abrasive problem that cannot be solved by the standard pattern, call a "CARBORUNDUM" Representative. He has access to the latest information from other users and from the "CARBORUNDUM" laboratories.

And there are always the "CARBORUNDUM" Abrasive Engineers. These are the men who know abrasives and their uses from the inside out. They have helped originate many of the present-day standard grinding techniques. They can sit right down with you at the planning stage and help you work out your problems from the start, as they have done for many manufacturers. For the solution to all your abrasive problems consult your "CARBORUNDUM" Representative. He will be glad to be of service. Write to The Carborundum Company, Niagara Falls, New York.



THERE IS A PRODUCT BY  
**CARBORUNDUM**  
TRADE MARK  
FOR EVERY ABRASIVE APPLICATION

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not simple, however, because any slight variations in the temperature of the piece will cause a corresponding variation in the rate of flow of the air or gas through the interstices. Permeability of abrasive compositions is measured, therefore, in a room where the test piece has been conditioned for several hours at a constant temperature and at fairly constant humidity—always less than 50 per cent R. H.

Permeability is such a sensitive test of the pore condition of abrasive composition that it can be relied upon to detect slight differences in the firing of the piece. This critical laboratory method for determining the nature of the pores in a grinding wheel, added to the other test methods such as porosity, the bulk volume, grade hardness, percentage composition, screen test of the grit mixture, compressive strength, and so on, thus ensures not only uniformity, but also

efficiency of the grinding wheel product. Such methods permit of alteration of the structure under controlled conditions as required by the specific grinding job that is being studied by the abrasive engineer.

While the internal structure of a grinding wheel or other abrasive composition is measured by the property of permeability, as described in the foregoing, the external surface is useful, as well, for study of the abrasive, bond and pores that constitute this commercial composition of matter. The high powered binocular microscope may be used on the original wheel, thus retaining the original specimen intact, or a petrographic microscope with or without polarized light may be used on a thin section such as mineralogists and metallurgists have used to study the structure and crystallization of rocks and metals.

Such a thin section is prepared

A. I. S. I.



S. A. E.

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Scientifically selected to conserve critical alloys and meet the requirements of the AIRCRAFT, ORDNANCE, and MACHINE TOOL industries.

Complete "EARMARKED" stocks of Aircraft alloy steels at Buffalo and Detroit.

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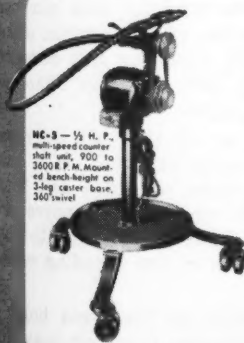


Save these for work a machine can't do

**T**here was a time, not so many years ago, when the words "Made by Hand" were synonymous with highest quality. In some things this still holds true.

But it is equally true that many operations can be done better and faster, with a greater degree of efficiency, when a Haskins Flexible Shaft Machine is used. And this with much less strain and fatigue on the part of the operator.

Grinding—Sanding—Rotary filing—Wire brushing—Buffing and Polishing—all are machine operations. There are many more. Write for Catalog 45, showing many ways to save your hands and speed production with flexible shaft equipment.



NC-5 — 1/2 H. P.  
multi-speed counter  
shaft unit, VFD to  
3600 R.P.M. Mount-  
ed bench-height on  
24" center base.  
360° swivel



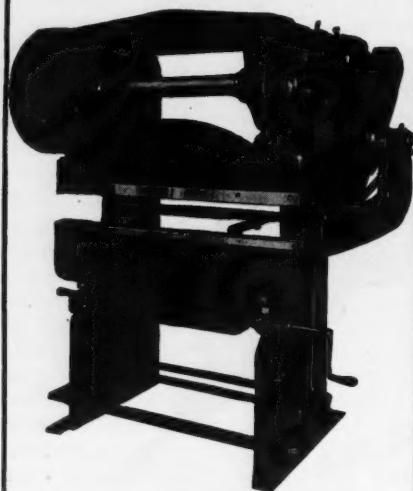
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619 South California Ave., Chicago 12

*haskins*

FLEXIBLE SHAFT EQUIPMENT

# CHICAGO STEEL PRESS

No. 253



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The No. 253 CHICAGO STEEL PRESS  
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constructed of highest quality materials.  
Sizes 4, 5 and 6 ft. capacities up to 10  
gauge.

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**DREIS & KRUMP MFG.  
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CHICAGO 36

ILLINOIS

from the abrasive mass by cutting out a cross section with a Carborundum Brand Diamond Wheel, Type D51. This wheel, which contains for its cutting particles genuine diamonds of the bort type, was developed and is used for finishing Tungsten Carbide and other extremely hard tool materials, but its usefulness has been extended to other fields among which the preparation of thin sections of minerals, rocks and abrasive compositions are typical applications. The diamond wheel for this use has cut down the time of preparation of the thin section from days to hours, and it gives an excellent surface without tearing the boundaries of the various ingredients in the structure under examination.

With such a thin section under the microscope, the specimen is magnified to permit of observations on the grit particles such as the color of the grit, the size of the grit, the uniformity of size of the grit, the sharpness of the grit and its shape. When it is realized that extraction of grit particles from a grinding wheel by chemical means may affect the grit because of the strength of the chemicals used for this purpose, the examination of the original wheel in its original condition and observations of the grit "in Situ" has obvious advantages.

The spacing of the grit aggregations are easily observed in a thin section; the size of pores and their number and whether the pores are sealed in by bond or grit help to give a good picture of the grinding wheel structure.

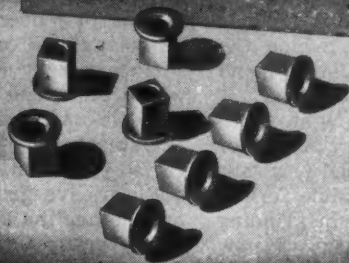
Observations on the bond holding the grit granules together may reveal whether the bond wholly coats the grains or whether it does so incompletely, indicating a weak contact strength. The wetting of the grit by bond, or lack of it, is an important



**JOHNSON  
BRONZE**

*Ledaloyl*  
SELF LUBRICATING  
BRONZE

**POWDER  
METALLURGY**



## *Makes the* **TOUGH jobs** **EASY**

Here's a typical example of Johnson Bronze Engineering Service . . . at work. The application was originally served by two pieces . . . a cylindrical bronze bushing and a steel washer. As such it was difficult to assemble; required constant lubrication; had a tendency to work out of place.

The solution was a flanged bearing, square on the outside, circular on the inside. This solved the assembly, and secured the bearing in place. The lubrication problem was ended when we produced it in LEDALOYL—self lubricating bronze.

The net result was longer life, smoother operation—and lower cost.

Isn't this the type of service you require? A Johnson Engineer is ready to assist you. Now.

**JOHNSON**

**SLEEVE BEARING**

**590 S. MILL STREET**

THE  
MOST  
COMPLETE  
SLEEVE  
BEARING  
SERVICE  
IN THE  
WORLD

**BRONZE**

**HEADQUARTERS**

**NEW CASTLE, PA.**

factor. If the wheel is bonded by a vitrified bond, the examination reveals the degree of vitrification and whether devitrification has set in with the accompanying crystallization of the bond ingredients.

A complete examination may require two thin sections, one parallel to the cutting edge of the grinding wheel and one at right angles to it. The preparation of two sections requires little more time than for one because of the ease with which the task is performed with the diamond wheel.

By the use of polarized light, abrasive crystals produce various color shades of the spectrum, and this tells something of their crystalline formation and their usefulness in grinding wheels.

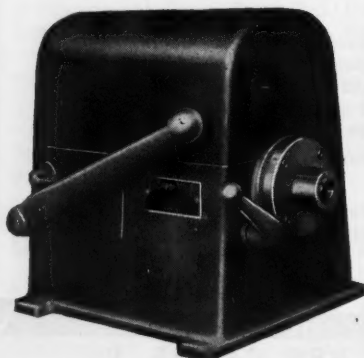
Physical methods, therefore, add much to the knowledge required to develop and maintain the efficiency of this modern tool of the mass produc-

tion shop. Whether the job is done by using silicon carbide on cast iron and soft metals or by electrically fused alumina on the great variety of steels now in use, the user is assured of duplication and of a controlled product as well done as current engineering and modern laboratory practice permits.

After a grinding wheel has been in use on one of the thousands of applications in modern industry, whether for snagging, forming, production of surface effects or cutting off, during which the wheel is subjected to compressive and shearing forces another examination by the microscope will reveal whether the union of bond and abrasive grit has been disrupted or whether the individual grains have been fractured. It is the balance between grain strength and grain-to-bond-union that, among other things, makes the wheel most economical and useful by allowing the gradual break-

# *The* **COLBORNE** *Speed Lathes*

**SPEED UP FINAL OPERATIONS ON  
DIES • GEARS • SCREWS • LONG RODS**



A recent addition to the COLBORNE line of Speed Lathes is the Series 30 machine. This speed lathe is indispensable for economical polishing, grinding, burring and lapping.

Very compactly constructed to do highest quality work with the COLBORNE features of spindle bearings running in oil, instant stopping brake, easy opening collet and standard speeds of 600-920-1720-3280-4800 RPM using ¼ H.P. motor and cone pulleys. Collets and chuck may be used.

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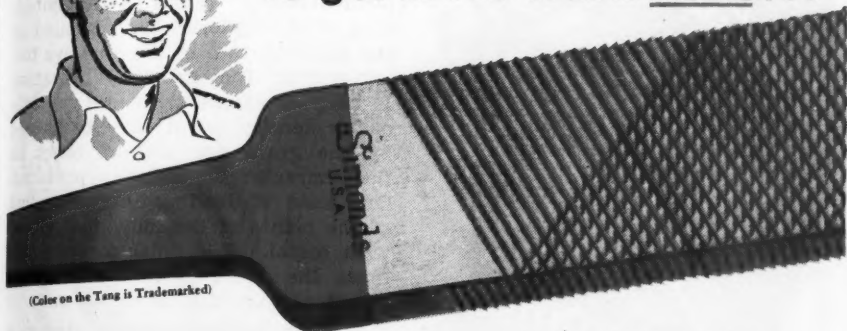
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ILL.

y, 1945



"Takes me a Lot Less Work  
to get More Work Done..."



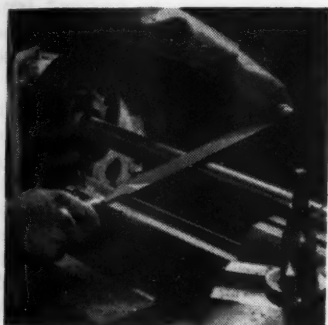
(Color on the Tang is Trademarked)

## ...with **SIMONDS** **RED-TANG FILES**"

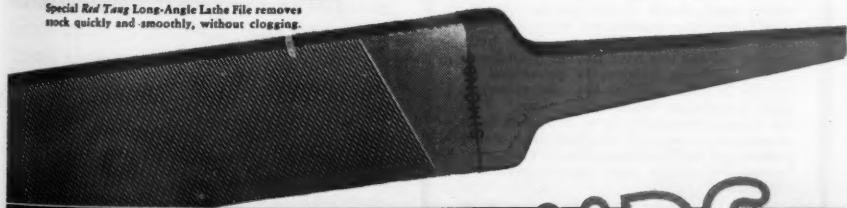
Workers like *Red Tang* Files because they can remove more stock with less elbow-grease. And management likes them because they stay sharp and last longer, giving more "file-mileage" per dollar. *Red Tang* Files cut (instead of scrape) with teeth designed like the teeth of a Simonds metal-cutting saw ... curl up long, even chips.

Made under ideal conditions in the world's first windowless plant, Simonds *Red Tang* Files come in only one quality ... the highest standard to which *any* file can be made. So next time you need standard files, tell your dealer specifically to send you Simonds *Red Tang*. Then measure the extra value you get.

BRANCH OFFICES: 1350 Columbia Road, Boston 27, Mass.; 127 S. Green St., Chicago 7, Ill.; 228 First St., San Francisco 9, Calif.; 311 S. W. First Ave., Portland 4, Ore.; 31 W. Trent Ave., Spokane 8, Wash.



Special *Red Tang* Long-Angle Lath File removes stock quickly and smoothly, without clogging.



PRODUCTION TOOLS  
FOR CUTTING METAL,  
WOOD,  
PAPER, PLASTICS

**SIMONDS**  
**SAW AND STEEL CO.**  
FITCHBURG, MASSACHUSETTS

CUT THE WAR SHORT... BUY WAR BONDS... AND THEN BUY MORE WAR BONDS

May, 1945

MODERN MACHINE SHOP 193



## Model J A NEW IN DESIGN

The Model J A is new in design both inside and outside. In it are utilized fewer parts, and they are made of Magnesium and Aluminum for extreme featherweight lightness. The alloy steel shaft diameter is unusually large for sustained smooth and true operation. This means still longer wheel life and better grinding. The speed, as before, is governed at 50,000 R.P.M. and there are selected ball bearings, front and rear. The J A Featherweight is a distinct improvement over all models previously produced by Madison-Kipp, the originators of really high speed grinders. **ORDER TODAY!**

**THE SAME \$29<sup>75</sup>**  
**LOW PRICE!** in U.S.A.

Weight 12 Ounces; Length 6 $\frac{3}{4}$  In.  
Chuck Size  $\frac{1}{8}$  In. Wheel Guard  
Removed for Better Illustration.

**MADISON-KIPP CORPORATION**  
208 WAUBESA ST., MADISON 4, WIS., U. S. A.

ing down of the structure as soon as the crystal has dulled.

Evidence of loading and glazing is also sought by the microscopic test on the used grinding wheel. The term "loading" refers to the embedding of the material being ground on the grinding face of the abrasive tool performing the grinding operation. It may be caused by wheel porosity or by density, or it may be caused by the grain size and its effect on the character of the chip produced. One kind of loading is the tipping of the points of the individual grains with metal. For finishing jobs this gives the effect of a coarser wheel structure than that in actual use.

Glazing is due to too strong a bond, which prevents the grit from being dislodged from its setting. The work rides on the worn areas of the crystals, which assume a polish.

These observations coupled with many others, such as the Nature of the Material ground, type of grinding operation, whether snagging, cylindrical, surface, internal, the speed of wheel, the speed of work, the wheel feed, the nature of coolant, the method of dressing the wheel, all combine to assist the abrasive technologist in the proper selection of the wheel for the job.

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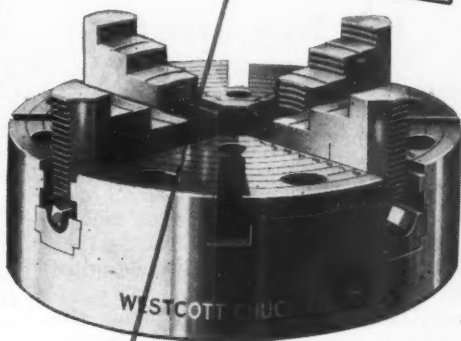
"Research in Physical and Metallurgical Effects on High Speed Direct Air-Gas Heat on Metals" is the title of a bulletin published by the American Gas Association's Committee on Industrial Gas Research. The metallurgical laboratory work on which the bulletin is based was conducted by the Selas Corporation of America, Philadelphia, Pa., under the sponsorship of the Committee. The editorial and publication work was done by the American Gas Association Testing Laboratories, Cleveland, Ohio.

Copies of the bulletin are available from the American Gas Association, 400 Lexington Ave., New York 17. New York.

# TEST A WESTCOTT

.. against *any* Chuck you are using  
for

## DURABILITY



Maybe Westcotts are made *too* well! We know of service records of 24 years, 27 years, 32 years—with only minor parts replaced. (Of course, those chucks had the extra care that every fine chuck deserves.) Yes, Westcotts are durable—and that's a mighty important quality in a production tool that *can* be a bottleneck. That's why we say—TEST A WESTCOTT.

WESTCOTT—*Precision manufacturers since 1872.*

# WESTCOTT

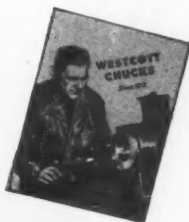
## Chucks

PRECISION • DEPENDABILITY • SERVICE

### SEND

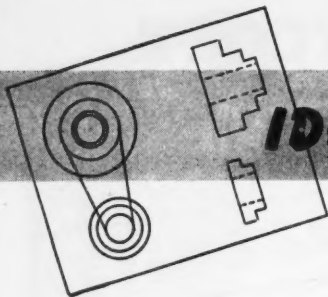
for Catalog 600.

Westcott Chuck Co.  
724 E. Walnut St.  
Oneida, N.Y.



May, 1945

MODERN MACHINE SHOP 197



## IDEAS FROM READERS

### Heat Treat Oven for Welding Shop

(Courtesy The Hobart Brothers Company, Troy, Ohio)

**T**HE illustration shows a small oven of arc welded construction now in use in the plant of Tycoon Tackle, Inc., Miami, Florida. The oven was designed by James Neary, one of Tycoon's welders, for use in preheating inner and outer cylinders of certain airplane parts to a temperature of 800 to 900 degrees preliminary to welding.

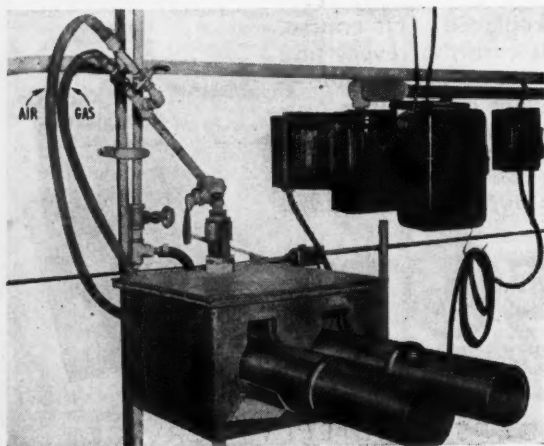
This small oven not only eliminates the necessity for using the large ovens in the heat treating department, but

provides a further advantage in that it is operated in the welding department, heating the parts quickly and evenly so that the production welder doesn't have to wait for the heated parts. The oven is heated by city gas and the preheating eliminates the possibility of cracks in the weld.

Fabricated of  $\frac{1}{4}$ -inch steel, the construction includes a double wall, the inner wall being completely insulated from the outer wall by two inches of asbestos sheeting. Inside, the box is 24 inches front to back, 30 inches long, and 18 inches high. The box has a removable lid upon which a fixture is welded so that a flame can be directed into the oven by an air pressure gas cap. A square of fire brick is laid in the

inner box, directly under the gas jet where the flame will strike it. The oven is mounted on one-inch pipe legs.

The two tubes shown projecting from the furnace in the illustration are cylinders of chromoly steel, each of which has a lug on the end that must be welded. To weld it without danger of cracking both the lug and the cyl-



Oven Designed and Built in Plant of Tycoon Tackle to Preheat Parts for Welding



VERSATILE HOB  
AND MILLING  
CUTTER CHECKER

Exact Size Measurements  
of External and Internal  
Helical Involute Gears

Cone-Drive Geo.  
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FINE PITCH GEARS  
By E. E. Bourke, Gear Engineer.

**News on  
Gear  
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**MICHIGAN TOOL COMPANY**  
Detroit 12, Michigan  
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Originators of Gear Finishing

Are you on the GEAR  
PRODUCTION HIGHLIGHTS Mailing List?  
Ask for it on your company letterhead.

Checks Spiral Gear Leads  
From Zero To Infinity  
New Internal Gear Finisher  
Cone-Drive  
ASSEMBLY  
SHAPED

NEW CUTTER

RELIEVING MACHINE  
CONTROLLING SHAVED  
AERO-GEARS QUALITY

**QUENCHING DIES CONTROL**

MASS PRODUCTION OF SMALL  
FINE PITCH GEARS

AERO ENGINE GEARS  
NOW FINISHED BY SHAVING

Correct Locating  
Methods Eliminate  
Misalignment

LAPPING WIRTS

SHAVED-GEAR QUALITY

"Largest" Generated Gear

Locating  
Gear Troubles

Novel Pinion Mounting  
Simplifies Assembly

ZERO BACKLASH IN  
SPLINES NOW POSSIBLE

Universal Products adapts gear  
shaving process to production  
of splines for automotive use

Shaving and  
Lapping Gears

Standardized Equipment  
Adapted By [REDACTED]  
For Precision Gears

Largest GEAR FINISHER SHOWS  
FLEXIBILITY at [REDACTED]

Correct Locating  
Methods Eliminate  
Misalignment

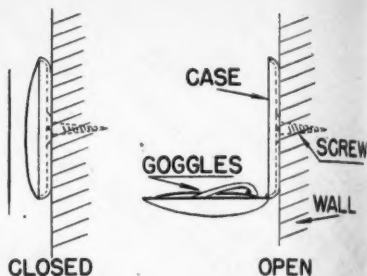
inder, these parts are preheated to the temperatures indicated above. The oven simplifies this operation, preheating a cylinder in 10 minutes.

## Safety Goggle Suggestion

By RONALD EYRICH

**W**HILE it is generally conceded that safety goggles always should be worn when grinding tools or work on the grinding wheel, this precaution is too often ignored. After the accident has happened, the worker usually tries to excuse his neglect with the plea that goggles weren't handy, or that he didn't want to take time to get his goggles from the bench when he was going to use the wheel for only a minute.

At our plant we solved the problem by fastening an ordinary metal gog-

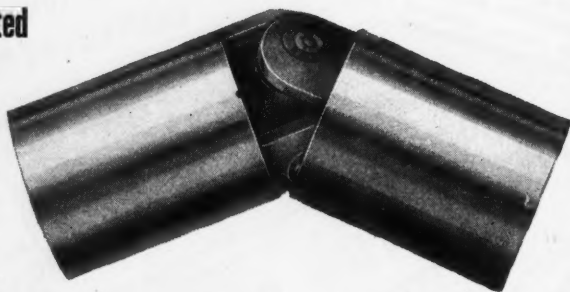


Drawing Illustrating Method of Attaching Goggle Case to Wall Near Grinder

gle case to the wall near each grinder. The cover of the case was fastened directly to the wall with screws, with the hinge side down, as shown in the drawing; thus the case can be opened or closed to remove or replace the goggles without danger of the goggles falling out. A goggle case fastened near a machine in this fashion will not only remain in its place, but will serve as a constant reminder.

## The ATLAS Precision Universal Joint

**Balanced  
Heat-treated  
Parts**



Made from Alloy Steels. All parts accurately ground. Can be supplied in Bronze.

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**GRAY & PRIOR MACHINE CO.**  
600 WINDSOR ST., HARTFORD 5, CONN.

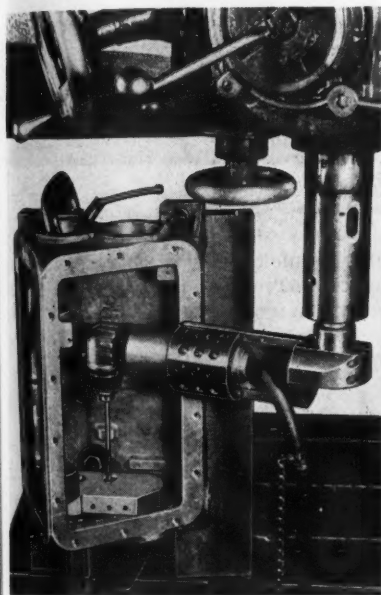
On the West Coast write to Link Belt Co., located in San Francisco, Oakland, Los Angeles, Portland and Seattle.

## Unique Drilling Setup

By HAROLD DENYSE

Industrial Methods Department,  
Westinghouse Electric Elevator Co.,  
Jersey City, N. J.

**T**HE illustration herewith shows how a difficult drilling operation is performed in the Westinghouse plant. The part on the drill press table has

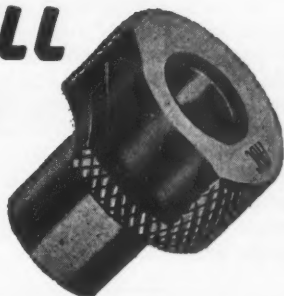


Unique Angle-Drilling Setup Devised for Drilling a Difficult Job

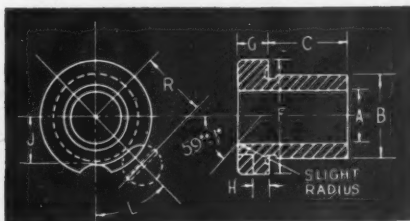
several blind tapped holes in the inside of its walls; this, along with many obstructions, prevents the use of conventional drilling methods.

A bracket was made to hold an angle electric drill in the spindle of the three-foot radial drill press. This bracket consists of a tapered shank, attached to a heavy holder at right angles. The body of the angle drill is clamped tightly in the holder, which is perfo-

## A. S. A. STANDARD PRECISION DRILL JIG



## BUSHINGS From STOCK



### 5 STYLES

- Headless Press Fit Bushings
- Head Press Fit Bushings
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Also a complete line of accessories.

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MODERN MACHINE SHOP 205

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May, 1945

May, 1945

rated to aid in keeping the electric drill cool. The heavy bracket is designed to be as rigid as possible so as to prevent drill breakage and insure a good quality hole.

In making this setup, the operator must be sure that the drill centerline is parallel to the spindle centerline so that, when the spindle is lowered, the drill enters the work perpendicularly. Tap wrenches with universal joints are used to tap the drilled holes.

This setup, which proved to be quite successful, can be used for drilling holes to the capacity of the electric angle drill.



Checking the Accuracy of a Tool, Using an Illuminated Ground Glass Inspection Plate

## Illuminated Ground Glass Inspection Plate

**A**N illuminated ground glass inspection plate has been devised at General Electric's Pittsfield Works as a

simple, quick means of checking angles on tools or matched cutters. The glass is set in a wooden frame at an angle of

# Rawhide

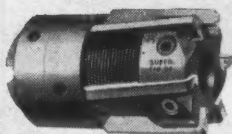
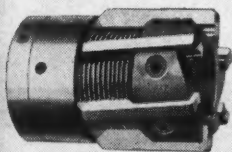


The best "soft" hammers and mallets are rawhide — tough, resilient, long-lasting C/R mechanical rawhide. They strike effective blows without battering or marring . . . without fatiguing re-coil. They hold their true striking surfaces. Sizes and weights for every need. Hammers are malleable iron with replaceable C/R Rawhide insert faces.

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**CHICAGO Rawhide MFG. CO.**  
1231 CLYDE AVE. CHICAGO, ILLINOIS

# McCROSKY Super Adjustable REAMERS



## Cut Costs On and Off the Job

• Positioning of McCrosky's service proved pin and screw locking device in front of the blade, enables the screw lock to work *'with'*, rather than against the cutting thrust,—thus holding the blade securely in the slot, even when in fully extended position.



Sectional View Showing  
Bearing Screw and Pin  
That Hold the Blade Rigi-  
dly Against the Body.

Blades can be released easily, and adjusted uniformly. This

permits them to be reground with a minimum loss of stock, and the reamer returned promptly to service, reducing the number of tools required to keep a job in continuous production.

McCrosky reamers are furnished with straight or taper shanks, or in shell design for mounting on hardened arbors. Sizes up to 6" in diameter with High Speed blades. Larger sizes, or reamers with special blades on request. Send for Bulletin 16-A.

# McCROSKY TOOL CORPORATION

MEADVILLE, PA.

COST  
CUTTING  
TOOLS

*Designers and Manufacturers of*  
**Jack-Lock MILLING CUTTERS**

**Wigard CHUCKS AND COLLETS**

**Super Adjustable REAMERS**

**Block Type BORING BARS**

**Turret TOOL POSTS**



approximately 65 degrees. The light source under the plate is a standard 100-watt lamp.

The tool to be checked is placed on the plate and the protractor or template is placed against the side of the tool. Any error is immediately discernible. The method provides a positive check against the true cutting edge of the tool, which is not always possible when the protractor is held in one hand and the tool in the other.



**LUMA**  
Patented

Combination Demagnetizer and Electric Etching Pencil. Marks symbols in hardest steel. Demagnetizes instantly. One of our models popular in tool rooms for 15 years.

**Luma Electric Equipment Co.**  
DEPT. MS TOLEDO 1, OHIO

This inspection plate is inexpensive and simple to make, and can be replaced easily if broken. It can be used by inexperienced persons, and is adaptable to a variety of inspection jobs.

## Controlling Hand Feed of Fixture

By L. KASPER

**O**N light milling work, hand feeding of the table or fixture is most economical when the cuts are light and the feed short. However, there is a tendency of the operator to feed too quickly, especially if there is a piece or bonus rate set on the operation, thus resulting in rough, irregular cuts. The drawing illustrates a simple method of overcoming this difficulty.

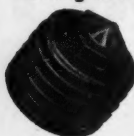
Referring to the illustration, A is the work table which carries the fixture, B is the operating lever and C is a pneumatic cylinder such as is used on a screen door closer, and which may be purchased for about two dollars. One end of the cylinder is attached to the machine table or other stationary part, while the other end is attached to the operating lever.

As cylinders of this type usually offer resistance to movement only during about the last quarter of the stroke, the positioning of the cylinder must be such that resistance is offered



## A REAL HELPING HAND

It's a help that die makers, tool makers, machinery builders and general machinists have long sought—a more accurate and surprisingly faster way of transferring blind screw holes.



The Heimann Transfer Screw Set is a self-contained, complete tool. No wrenches or pliers are necessary. Made in  $\frac{1}{8}$ " to 1" diameters. Send for price list.

**HEIMANN MFG. CO.**

330 Lincoln Ave.

Urbana, Ohio





# IS A *Plane* SURFACE POSSIBLE?

9.00 mm Fonda Gage Block No. 098

Tw 101734

1 division = one-millionth of an inch  
 Profilometer reading = 0.3 to 0.4 micro-inch root mean square.

## Can it stay true?

• Wring together FONDA gage blocks. No oil or other film is necessary! See how easily they wring... and how strongly they adhere.

The reason? Simply that the "ULTRA-FINISH"—a process exclusive with FONDA—has imparted to the gaging surfaces a smooth flatness (without appreciable peaks), which constitutes the nearest approach to a perfectly plane surface found hitherto in gage blocks.

No peaks to wear off and change the block size... no films to change over-all dimensions of the wrung blocks...

And—a FONDA-developed new STABILIZING process which eliminates growth or shrinkage (at 68°F.), during the entire period of gage block service!

• It can be seen why FONDA gage blocks are specified in plants and laboratories where "fine-precision measurement" means just that.

Prompt Deliveries

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PASSED HIGHEST TESTS  
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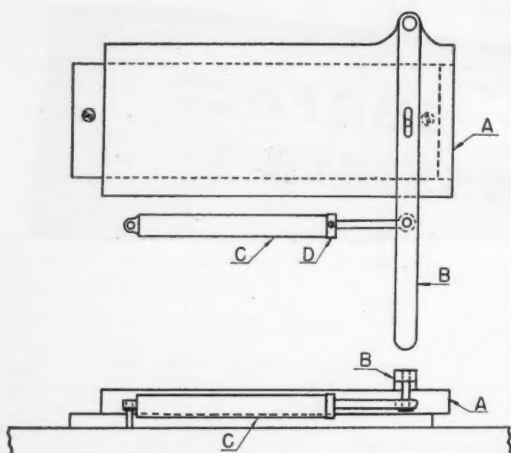
WRITE

## FONDA *Gage Blocks*

ALSO FONDA PRECISION GAGES:  
 Dial, Plug, Ring, Snap, Profile, Flush Pin,  
 etcetera... all types except Thread Gages

May, 1945

MODERN MACHINE SHOP 209



Drawing illustrating method of controlling hand feed on machine by application of pneumatic cylinder

an adjusting screw, D, with which the speed of the table during the cutting portion of the travel may be controlled.

The cylinder shown in the illustration is of the type which is attached to the outside of the door; other types, which are used on the inside of the door will have the ad-

only during the cutting portion of the travel of the work table, so that the travel from the loading position to the cutting position may be accomplished quickly. The cylinder is equipped with

justing screw on the opposite end of the cylinder, in which case the cylinder must be attached so that the movement of the lever B will push rather than pull on the piston rod.



## PLAN Now TO GIVE YOUR PRODUCT BETTER POWER TRANSMISSION CONTROL

Don't wait until peace comes. Overnight, wartime destruction may turn to peacetime construction—and competition become keener, and more ruthless. Make sure that

your products benefit from the latest clutch developments. Put the advantages of our unmatched transmission engineering experience and clutch manufacturing facilities into your new designs. Let our engineers show you why "ROCKFORD" — on your blueprints, — means the most suitable power transmission control.

## SEND FOR THIS HANDY BULLETIN ON POWER TRANSMISSION

It shows typical installations of ROCKFORD CLUTCHES and POWER TAKE-OFFS. Contains diagrams of unique applications. Furnishes capacity tables, dimensions and complete specifications. Every production engineer will find help in this handy bulletin, when planning postwar products.

## PULLMORE CLUTCHES

### ROCKFORD CLUTCH DIVISION

[Formerly Known as Drilling Machine]  
Borg-Warner Corporation  
300 Catherine Street, Rockford, Ill.



# ATTENTION!

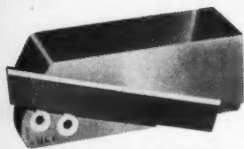
## Screw Machine Operators!

BUY  
MORE  
BONDS



**Put These Efficient Tools on Your Machine  
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**CUTTING-OFF BLADES THAT  
ELIMINATE EXCESSIVE  
FRICTION AND REDUCE  
DOWNTIME . . . . .**



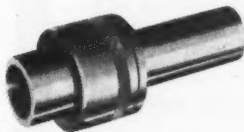
Used in holders to fit any standard hand or automatic screw machine. Trouble-less cut-off blades—provided with more-than-average clearances, so excessive friction is eliminated.

They reduce downtime because resharpenering is done only on front face—even by inexperienced help—without disturbing set-up.

Rapidly becoming the most popular cut-off blade in industry. High efficiency attained through distinctive T-design. Send for literature that fully describes Empire Tool Company's Luers Patented Cutting-Off Blades. Once you try them you'll always use them.

EMPIRE TOOL COMPANY MANUFACTURED BY JAMES W. LUEERS PATENTED CUTTING OFF BLADES  
AND HOLDERS UNDER LICENSE FURNISHED BY JOHN W. LUEERS PATENT, INC.

**FLOATING TOOL HOLDERS  
THAT COMPENSATE FOR  
OUT-OF-PARALLEL AND  
ANGULAR MISALIGNMENT**



You'll have no more bell-mouthed holes. Every hole you'll ream—right from the very first one—will be perfectly round—and you can stay to close limits.

The notable accuracy achieved by this holder can be attributed to the unique design which incorporates a universal float. This provides the free floating action in *all* directions to compensate for both off-center and out-of-parallel misalignment.

Composed of only five parts, the Empire Floating Tool Holder requires very little maintenance. There's nothing to get out of order—to fall out, or get lost.

**EMPIRE  
TOOL COMPANY**

**8774 GRINNELL AVE.  
DETROIT 13, MICH.**

MODERN MACHINE SHOP 211

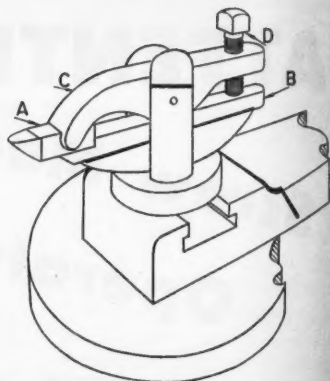
Try either of these tools in your own plant for 30 days. If it does not help your production, send it back for full credit.

May, 1945

## Special Toolholder for Short Toolbits

By CHAS. H. WILLEY

**I**NASMUCH as present conditions make it necessary to conserve all high speed tool steel bit ends, the toolholder illustrated in the drawing has been designed. The short toolbit end **A** is clamped to the bar **B** by the clamp **C**, pressure being applied by means of the



Drawing of Toolholder Especially Designed to Hold Short Toolbit Ends

setscrew **D**. The usual rocker piece is used under bar **B**, so that the tool can be set at the required angle, and inasmuch as the toolpost has a circular foot, it can be moved to any angle in a horizontal plane. The front end of clamp **C** must be shaped to fit the toolbit.

The toolholder has been found very practical, and will save its cost in a short time.

## Convair's Dual-Action Toggle Clamp

**A** DUAL-ACTION toggle clamp, invented by Weldon G. Bowlus of the Fort Worth plant, is now being

**ALLIGATOR**  
TRADE MARK  
**FILES**

Over 4,000 shapes, cuts and sizes of both Swiss and American patterns.

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Modern Vises for Tool-room and Production. Sizes ranging from 3" to 10 1/2" opening. Strong, Versatile, Quick-Acting. Pay for themselves in time-saving.

Write for circular describing entire line of GEM MACHINE VISES.

**J. E. MARTIN MACHINEWORKS**  
548 State St. Springfield, Ohio

# THREE ACES TO DRAW TO



If you've ever played poker (and who hasn't?) how often has it been that you wished you could "win" with a hand like this?

We can deal you a hand like this for your plant! Knock-Out Universal or Carbide Tool Grinders will prove to be the finest Aces anyone can deal you. They will pay their way and prove their worth many times over on tool maintenance or product production.

New and advanced features have given Knock-Out undisputed leadership in the Tool Grinder field. Versatility of operation and operator convenience have always been two prime factors in the minds of K-O Engineers. These, together with low initial cost and operation economy make K-O Grinders Aces—every one! Quick, easy setup on tools ranging from the smallest size to cutters twelve inches in diameter are made possible with K-O designed fixtures and accessories.

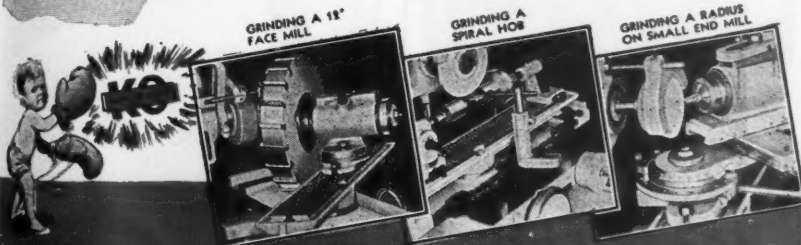
Correct machine design has placed operating parts where they will function with maximum performance and operator convenience. K-O Engineers have made available more time-tested fixtures and accessories than

has any other tool grinder manufacturer, thus making K-O Tool Grinders truly universal. Single-speed or Multiple-speed motor heads are available. The K-O SPEED HEAD permits the operator nine speeds from which to select for the job at hand. These speeds range from 1,100 to 11,000 R.P.M.

Knock-Out Universal Tool Grinders are built to accommodate most any high-speed steel cutters as well as carbide tip tools. K-O Carbide Tool Grinders are built to handle all grinding and sharpening operations necessary on single point carbide tip tools or, if desired, for grinding chip breakers only.

Thinking men are now planning for reconversion. Let us tell you how to include these "three Aces" in your plans.

See your nearest Knock-Out Distributor or write now for catalogue No. 35-55.



*If it's made by Lee—it's a Knock-Out!*

SEE YOUR NEAREST DISTRIBUTOR OR WRITE DIRECT TO

**K. O. LEE CO. ABERDEEN, SO. DAK.**

# ROGERS PATENT ADJUSTABLE HOLLOW MILLING TOOL

now helping win its third war  
and still going strong.

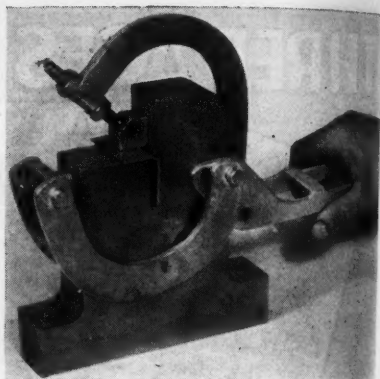


*Carbide Tips Optional.*



Easily Adjusted. Rigidly Locked.  
Rogers Built Since 1890.

**THE JOHN M. ROGERS  
TOOL CORP.**  
Gloucester City New Jersey



Convair's New Toggle Clamp with Its Clamp Pad and Handle in the "Down" Position

used by Consolidated Vultee Aircraft Corporation to facilitate drilling and assembly work in which it is necessary to double-clamp angular parts.

The clamp has a substantially rectangular body with integral and projecting feet which can be used in at-

Convair Toggle Clamp with Clamp Pad and Handle in the "Up" Position





is Clamp  
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Pad and  
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WRITE FOR  
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VALUABLE  
BOOKLET

# FRICTION SAWING

- SHEET STEEL Formed or Flat
- NON-FERROUS METALS Formed or Flat
- ARMOR PLATE
- SOFT or HARDENED STEELS
- PLASTICS
- GLASS and Other Materials

By Arthur A. Schwartz  
Chief Tool Research Engineer  
Bell Aircraft Corporation

*Sensationally Fast, Safe  
and Widely Applicable..*

this method is rapidly displacing other cutting  
methods. Learn all about it and the machines  
that make it possible —

**Tannevit<sup>3</sup>**  
**HIGH SPEED  
BAND SAWS**

**THE TANNEWITZ WORKS** GRAND RAPIDS  
4, MICHIGAN

May, 1945

MODERN MACHINE SHOP

215

May, 196

taching it to a work bench, a jig, or a fixture. It is actuated simply by moving a handle up or down.

Two arms, attached by pins to the handle, provide the dual action which makes it possible to position a metal "pad" against one or two angles situated appropriately in the upper portion of the base. A screw-type adjustment enables workers to govern the tightness with which the pad is clamped in place.

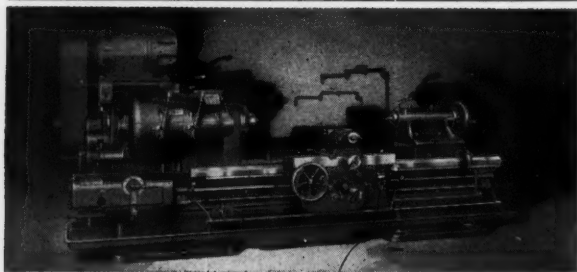
Advantages of the new device are:

- (1) No part of the clamp has to be assembled or disassembled in order to accomplish the necessary operations.
- (2) The clamp can be used in connection with numerous tools and varied types of work.
- (3) The clamping action is such that the parts being drilled or assembled are not subject to out-of-line slippage.

**Putnam Tool Catalog.** Announcement is made by the Putnam Tool Company, 2981 Charlevoix Ave., Detroit, Mich., of a catalog featuring the company's complete line of metal-cutting tools. Designated as the No. 44, the catalog comprises 92 pages and illustrates in two colors the full line of Putnam end mills, chucking reamers, continuous pilot counterborers, holders, and other products. Complete specifications, prices, and so on, of all of the 1023 items now in the Putnam line are listed. Additional sections are devoted to Putnam special purpose tools and engineering data of value to cutting tool users.

The cover, which is sturdily made to provide for long service, is of light blue textile leather, with die stamping of the Putnam title and trademark in silver and contrasting dark blue foils. An inside pocket of the slip cover holds the body of the catalog which is spiral bound to permit the pages to lie flat wherever opened. A unique feature of the catalog is its unusual index which is illustrated and carries the title "Pictorial Tool Selector."

Copy of Catalog No. 44 is available to executives addressing requests on their company letterheads.



## Engine Lathes

### THE BOYE & EMMES MACHINE TOOL CO. OHIO

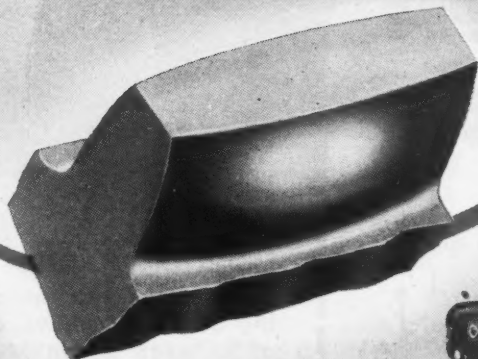
**CINCINNATI**  
 BIRMINGHAM.....Pratt & Whitney Co.  
 BOSTON.....Pratt & Whitney Co.  
 BUTTE.....Sullivan Valve & Engineering Co.  
 CHARLESTON, W. VA.,  
 The McKunkin Supply Co., Inc.

CHICAGO.....P. P. Wagener, Wilmette  
 CINCINNATI.....Pratt & Whitney Co.  
 CLEVELAND.....Pratt & Whitney Co.  
 DETROIT.....D. E. Morand Machinery Co.  
 DULUTH.....W. P. & R. S. Mars Co.  
 GRAND RAPIDS.....Joseph Monahan  
 HARTFORD.....Pratt & Whitney Co.  
 HOUSTON.....Huge-Fayle Supply Co.

Indianapolis Machinery Export Co., New York, New York—Export Distributor  
 Canadian Representative: Moore Bros. Mach'y Co., Ltd., Montreal

LOS ANGELES.....Jack Brewer  
 MILWAUKEE.....Nichol Machinery Co.  
 NEW ORLEANS.....Woodward, Wight & Co., Ltd.  
 NEW YORK CITY.....Pratt & Whitney Co.  
 PHILADELPHIA.....Pratt & Whitney Co.  
 PITTSBURGH.....Rees Machinery Co.  
 RICHMOND.....D. B. Parker  
 ROCHESTER.....Pratt & Whitney Co.  
 SAN FRANCISCO,  
 Schellenbach Machine & Tool Co.  
 SEATTLE.....Buckner-Weatherby Co., Inc.  
 ST. LOUIS.....Pratt & Whitney Co.  
 TOLEDO.....Frank D. Lake Co.

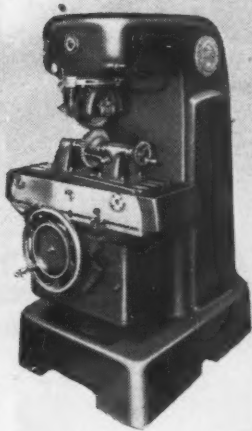
# THE MOST IMPORTANT MODERN GEAR DEVELOPMENT IS THE Elliptoid Tooth Form



The Elliptoid (crowned) gear tooth form eliminates the most important cause for gear tooth failure—"end bearing". When the gear tooth load is carried away from the ends of the tooth consistently, its full strength may be relied on. But when the load is concentrated on either end of the tooth, that gear is vulnerable.

The difference in tooth thickness between center and ends need be very little (.0003" to .0005" per inch of face), but when that difference is consistent, the gear develops maximum strength.

Red Ring Rotary Shaving Machines provide the means to give gear teeth Elliptoid Form, in addition to correcting errors in tooth spacing, helical angle, tooth profile, eccentricity and undesirable roughness.



**NATIONAL BROACH AND MACHINE CO.**

5600 ST. JEAN • DETROIT 13, MICH.

SPECIALISTS IN SPUR AND HELICAL GEAR SHAVING AND GEAR FINISHING  
PRODUCERS OF ROTARY SHAVING AND ELLIPTOID TOOTH FORMS

RED RING PRODUCTS

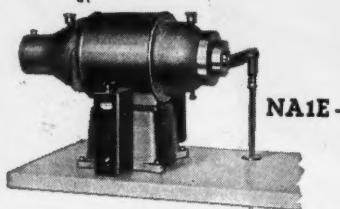


# IDEAL SPEED LATHES

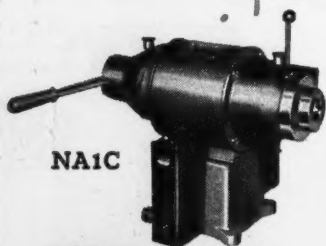
For accurate, uniform,  
speedy finishing of  
metal & plastic parts.



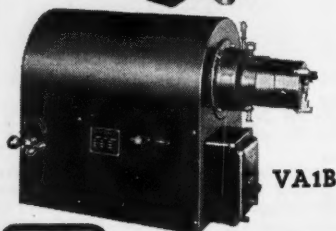
AWARDED  
October '42



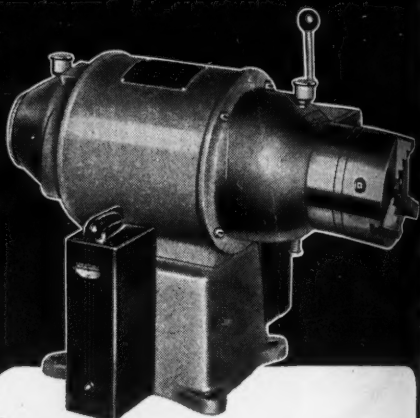
NA1E-



NA1C



VA1B



**POLISH • LAP • DE-BURR • FINISH**

**NA1B** (above) - for general finishing of gears, pulleys, dies, and other large pieces - metal or plastic.

**NA1E** - foot-operated collet type, for high-production finishing of many identical small parts.

**NA1C** - with hand- or foot-operated collet, to take up to 1" round stock.

**VA1B** - variable speed lathes, in bench and pedestal models, chuck and collet types.

*If you have a finishing problem  
WRITE FOR CATALOG 440*

# SCHAUER MACHINE COMPANY

ORIGINATORS OF TODAY'S SPEED LATHES  
2060 READING ROAD ..... CINCINNATI 2, OHIO

# UNDER *Control*

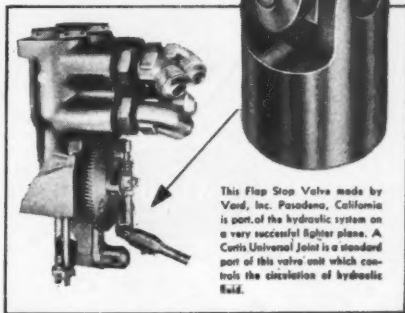


## ...WITH CURTIS UNIVERSAL JOINTS

Thousands of planes in use today in all parts of the world depend on Curtis Universal Joints to actuate vital mechanisms . . . for engine (gas and spark) rudder, elevator, landing gear or auxiliary power controls.

Where smooth, positive rotation of shafting at angles or around corners is necessary for planes or machine tools, a Curtis Universal Joint in any of 14 "Standard" sizes, or one specially designed to overcome difficult conditions, will more than meet specifications.

Curtis Engineers, with more than 20 years' experience in designing universal joints for many and varied types of installations, are ready to work with you on your present or future plans.



This Flap Stop Valve made by Vard, Inc. Pasadena, California is part of the hydraulic system on a very successful fighter plane. A Curtis Universal Joint is a standard part of this valve unit which controls the circulation of hydraulic fluid.

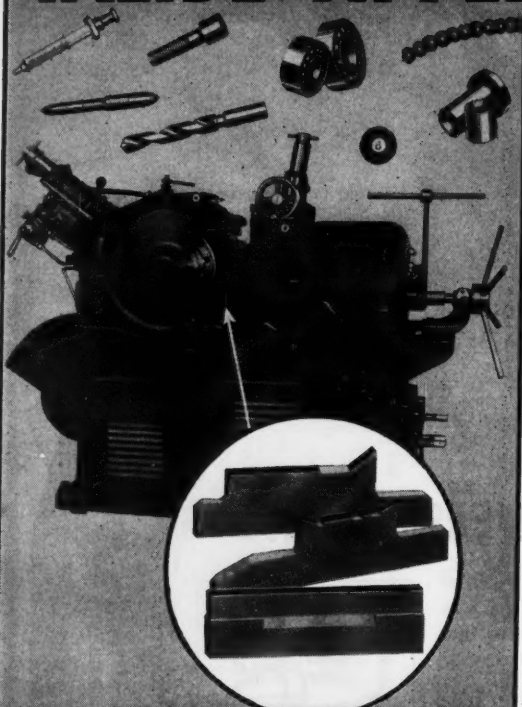
Write for new Curtis Engineering data and drafting templates . . . both are valuable aids to your designers and draftsmen.

**C CURTIS UNIVERSAL JOINT CO. INC.**  
SPRINGFIELD, MASS. . . . SOLE DISTRIBUTORS, BOSTON GEAR WORKS, NO. QUINCY, MASS.

May, 1945

MODERN MACHINE SHOP 219

# CENTERLESS GROUND *with* TALIDE-TIPPED BLADES



TIPPED  
WITH



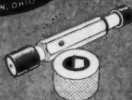
TUNGSTEN  
CARBIDE



BUSHINGS



CENTERS



BLADES



GRINDING

**TALIDE-TIPPED BLADES**, with Tungsten Carbide wear strips, have become standard equipment for centerless grinding armor-piercing shot, shells, projectiles, bullet cores, aircraft parts and other ordnance material.

The extra long life of super-hard Talide Blades, plus their natural ability to resist scoring and galling, have helped to increase the production of precision ground parts by eliminating down-time and rejects.

In the post-war period, Talide-Tipped Blades will be used to increase the production of lower cost roller bearings, fountain pens, cap screws, twist drills, bushings and a wide variety of shafts, spindles and screw machine products. Write for catalog 43-WP listing full particulars and prices.

## METAL CARBIDES CORPORATION

YOUNGSTOWN 5, OHIO

TUNGSTEN CARBIDE TOOLS - DIES - WEAR PARTS



## Abrasive G-P DIAMOND TOOL KIT

ABRASIVE DRESSING TOOL CO.  
Detroit, Michigan  
LEAD IN THE RED BAND OF EACH

# AT LONG LAST!

Diamond Tools for every purpose in a  
**HANDY, THRIFTY KIT!**



Each Kit with  
**REGISTERED GUARANTEE**

**10 TOOLS  
2 HOLDERS  
2 KEYS**  
Complete in Handy Kit  
only \$49.50

### Here's What You Get!

- ① 1 Abrasive diamond tool with 25 carats of diamonds for straight dressing wheels up to 20" x 1 1/2"
- ① 1 Abrasive diamond tool with 30 carats of diamonds for straight or form dressing up to 12" x 1"
- ① 1 Abrasive diamond tool with 60 carats of diamonds for straight or form dressing up to 20" x 2"
- ① Abrasive chisel-type diamond tool for all sizes of radii.
- ① 1 Abrasive Red Band with diamond at 65° included angle for 0.020 radius and larger.
- ① 1 Abrasive Red Band with diamond at 85° included angle for 0.025 radius and larger.
- ③ 3 Abrasive Phonopoints for 0.015 radius and larger.
- ① 1 Abrasive Diamond Scriber.
- ② 2 Abrasive Tool Holders.
- ② 2 Sturdy Keys.

**Important:** If your supply house has not yet stocked this G-P Kit, have them place your order . . . or place your own order direct for **IMMEDIATE DELIVERY!**

**DISTRIBUTOR TERRITORIES OPEN—WRITE FOR DETAILS!**

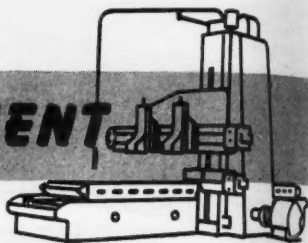
**THIRD GENERATION OF DIAMOND EXPERIENCE**

**H**ERE'S YOUR CHANCE to get a matchless assortment of dressing tools, radius tools, cutting tools, phonopoints, a scriber and a pair of sturdy, hand tool-holders—a kit that meets practically ALL shop requirements—at a saving that speaks for itself!

And remember, you get *quality* tools, backed by three generations of diamond experience. The **Abrasive RED BAND** of proven performance assures you *better* work, *more* work per set-up. Each kit is numbered for your protection. Place your order **TODAY!**

**Abrasive  
DRESSING TOOL COMPANY**  
Detroit, Michigan

## NEW SHOP EQUIPMENT



### LeMaire Special Drilling Machine

A special machine for drilling 29 holes from four directions in a truck axle mounting or carrier has been designed by LeMaire Tool & Manufacturing Co., Dearborn, Mich. The machine consists essentially of four standard LeMaire twin ram hydraulic units, two of which are located in a horizontal position at opposite ends of the long main base. An auxiliary base extending from the middle to the rear of the main base accommodates the third horizontal unit. The fourth unit, which operates vertically, is mounted on a column that straddles the rear unit.

A suitable cam and lever action workholding fixture is mounted on the machine in a convenient position for the operator. Brackets are provided to support guide bars for maintaining necessary alignment.

In the operation of the machine, the right and left heads each drill six  $\frac{1}{2}$ -inch holes and one  $\frac{3}{4}$ -inch hole. The rear head

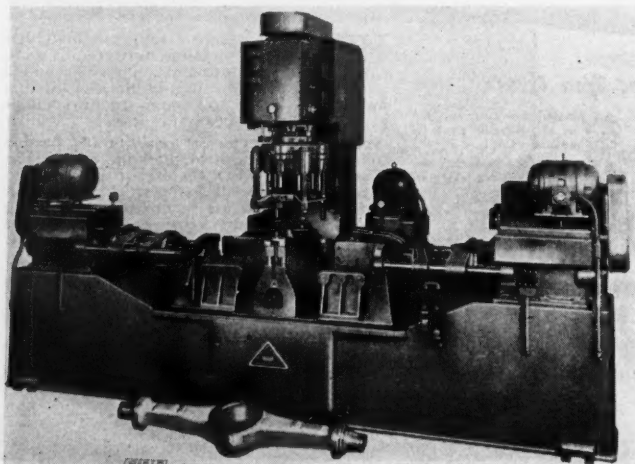
drills five  $\frac{1}{2}$ -inch holes and one  $\frac{1}{4}$ -inch hole. The vertical head drills eight  $\frac{1}{4}$ -inch holes and one  $\frac{1}{2}$ -inch hole. All 29 holes are drilled simultaneously at a production rate of approximately 75 pieces per hour.

### Maxant All Purpose Punch Press

Suited to a wide range of small punch press work, the Maxant All Purpose Punch Press illustrated herewith, product of the Maxant Button & Supply Co., 117 S. Morgan St., Chicago 7, Ill., can be used in performing stamping, perforating, blanking, punching, piercing, light drawing, forming, assembling, crimping, and other operations.

Designed for easy operation by unskilled workmen, the machine is said to function equally well on metal, rubber, synthetics, and plastics. Features include

a large crosshead; open-face construction to allow for quick changing of dies; ram which is adjustable to provide different numbers of strokes per minute, as well as strokes of various lengths; automatic wick rollers for guide rod lubrication; and hammered steel shaft.



LeMaire Special Drilling Machine

The body of the Maxant All Purpose Punch Press is heavily reinforced. The slides are designed for maximum resistance to wear and can be furnished in various lengths for changing the working distance above the press bed. Pilot bars are made of solid ground alloy steel, and the clutch is made of heat-treated alloy steel. The flywheel is constructed of solid metal which is grooved to accommodate a V-belt and is balanced to provide for smooth operation and maximum power.

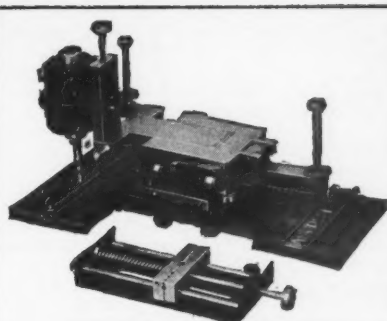


Maxant All Purpose Punch Press

Specifications of the Maxant All Purpose Punch Press are as follows: throat height, 10 inches; throat depth, 4 inches; distance of bed to slide, 7 1/4 inches; bed area, 9 x 8 inches; maximum stroke, 2 1/2 inches.

### Barnes 924 Vertical Drilling, Boring and Facing Machine

A basic machine that can be tooled and adapted to many types of high production jobs requiring up to 60 h. p. and 50-



### DUPLICATING AND PROFILING AUTO - ENGRAVER

**Accurate Engraving with Unskilled Operators**

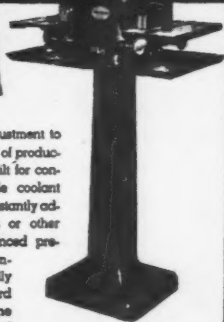
Unskilled operators will profile or accurately reproduce in smooth lines any design, number, letter, emblem; on iron, brass, copper, aluminum, soft steels and all plastics. Here are some of its other uses . . . Drills a series of holes, or profiles small parts. • Cuts an even channel for wiring on panels. • Increases accuracy and production. • Works from original drawing or templates. • Etches glass and similar items. • Will not cause distortion. For information and prices write Dept. M.

**AUTO-ENGRAVER COMPANY**

1776 Broadway, New York, N. Y.

### The CRITERION Carbide Tool Grinder

**GREATER  
PRODUCTION  
CAPACITY**



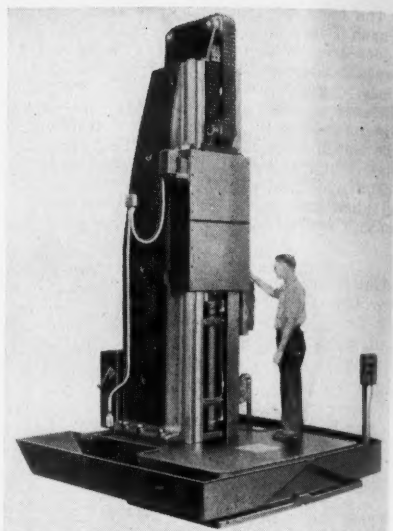
Provides positive rapid adjustment to meet the rigid requirements of production tool manufacturing. Built for continuous service. Adjustable coolant system. Large work tables instantly adjustable without wrenches or other tools. One-third HP balanced precision bearing motor completely enclosed and radially mounted in rubber. Standard equipment: One 60 and one 100 grit 7" dia. steel backed silicon carbide wheels. Ideal for metal bonded or Resinoid bonded diamond wheels.

Order from your dealer or write direct. Request literature. No obligation.

**CRITERION**  
MACHINE WORKS  
BEVERLY HILLS CALIFORNIA

000 lb. thrust, the Barnes 924 Vertical now being offered by the W. F. and John Barnes Co., Rockford, Ill., includes design and construction features that make it particularly suitable for mass production drilling, boring, facing, and reaming, especially on those jobs requiring wide-area heads.

Unusually slow feeds are obtainable for heavy facing work by simple adjustment of the hydraulic unit mounted on the side of the column. The heavy cored column casting with 24-inch ways provides a support for the head saddle and head which are counterbalanced by easily ac-



Barnes 924 Vertical Drilling, Boring and Facing Machine

## WALTHAM

**Sub-Presses  
Reduce  
Hand Finishing**



Available in arch and overhanging types in 10 diameters up to 6".

Alignment is attained for precision and clean work.

Lower costs through savings in time and effort.

SEND SAMPLES OR DRAWINGS  
FOR ESTIMATE.

**WALTHAM MACHINE WORKS**

Waltham

Massachusetts

cessible weights. The control bar with adjustable dogs for governing the head travel and the way lubricator are mounted on the head saddle.

The accompanying illustration shows the Barnes 924 Vertical arranged for drilling forty-five  $\frac{3}{4}$ -inch holes in cast armor plate.

## Geargrind Universal Chucking Grinder

The Geargrind Universal Chucking Grinder illustrated herewith, product of

## ... for more than 1001 odd jobs



HJORTH LATHE & TOOL CO.

12 BEACON ST., WOBURN, MASS.

The Hjorth Bench Lathe has the speed, accuracy, handling ease, and dependability that appeals to every operator. That's why you'll find the better shops equipping with the Hjorth Lathe.

WRITE TODAY FOR DATA  
AND PRICES.

McKAY MACHINE CO.

likes

# Quick-As-Wink VALVES

The Quick-As-Wink design incorporates simplicity, trouble-free service, and ease of application.

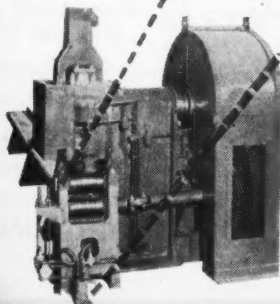
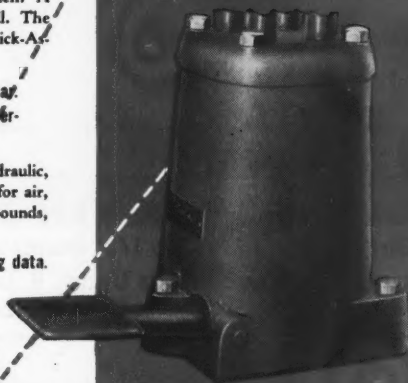
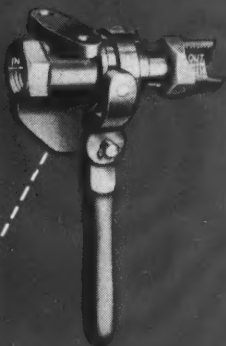
Consider this bar shear built by McKay Machine Company, Youngstown, Ohio. A Quick-As-Wink hand operated valve controls the hold down and clutch. A Quick-As-Wink foot valve operates the feed roll. The designer of the shear has this to say about Quick-As-Wink valves:

"They are the best valves for this type of shear."

We use them because of the simplicity of operation, speed, accuracy, and long life."

C. B. Hunt & Son manufactures solenoid, hydraulic, air, hand, foot, and diaphragm operated valves for air, water, or oil applications up to pressures of 5,000 pounds, in standard and special sizes.

The Hunt catalog carries complete engineering data. Send for a copy.



## C. B. HUNT & SON

1836 E. PERSHING ST.  
SALEM, OHIO



**Geargrind Universal Chucking Grinder**

the Gear Grinding Machine Co., 3901 Christopher, Detroit 11, Mich., is designed for grinding external and internal cylin-

drical and conical surfaces, generated or formed spherical external and internal surfaces, and generated or formed annular surfaces such as ball bearing races and fillets. In addition, the machine can be arranged to grind combinations of the above in a single setup, insuring both extreme accuracy and ideal blending of curved and straight surfaces, it is claimed.

Construction features of the machine include a heavy, vibration-free base; precision preloaded bearings for vertical oscillating spindle, workhead spindle, and grinding wheel spindles; dynamically balanced grinding spindles; quick-acting clamping attachments for collets or diaphragm chucks; micrometer feed screws for workhead setup and grinding wheel spindle; and adjustable diamond wheel truing device.

### **Porter-Cable Model WG-4 Wet Belt Surfacers**

Applicable to line contact grinding and polishing as well as platen machining, a wet belt surfacer designated as the Mod-

## **ROD GRINDING**

**Straight Rods 1/32" to 1/2" Diameter**  
**Diam. Tol. .0005 on Rods Up to 6' Long**  
**Diam. Tol. .001 on Rods Up to 12' Long**

**13 YEARS OF  
CENTERLESS GRINDING SERVICE**

**QUICK DELIVERY**

**HIGH QUALITY**

**COMMERCIAL CENTERLESS GRINDING CO.**

6605 CEDAR AVE. Phone: ENdicott 3412 CLEVELAND 3, OHIO

**SMALL  
PRECISION PINS  
MADE TO  
CUSTOMER'S  
BLUE PRINTS  
... STRAIGHT ...  
... DOWEL ...  
... TAPER.**



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HIO

May, 1945



## **"ROCKWELL" HARDNESS TESTER**

We want to take time out from talking about our machines to express a word of appreciation for the fine job our field men have done during the war. They have been perpetually on the jump in your interest and ours. Also, we thank you for the many courtesies and the co-operation afforded them.



AN ASSOCIATE COMPANY OF  
AMERICAN CHAIN & CABLE COMPANY, INC.

# **WILSON**

MECHANICAL INSTRUMENT CO., INC.

369 Concord Ave., N. Y. 54, N. Y.

MODERN MACHINE SHOP 227

**SEE BETTER • WORK BETTER**



**CARL  
ZEISS  
INC.  
HEADBAND  
MAGNIFIER  
2 1/4 x**

Use of both eyes reveals true depth of details. Magnification of 2 1/4 x. Free working distance, about 8", permitting unhindered use of hands. By just lifting your head, your eyes are free for any other activity. Eyeglasses may be worn while using. Highest optical quality. Eyeshade of Tenite—practically unbreakable.

Also **APLANATIC  
FOLDING POCKET  
MAGNIFIERS —  
6 and 9 power**



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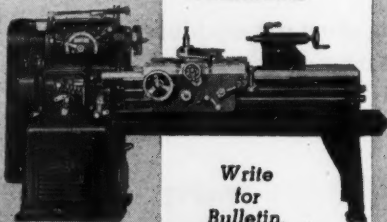
**CARL ZEISS, INC.**

Dept. H-51-5, 485 5th Ave., New York 17, N. Y.

**CARROLL  
AND  
JAMIESON  
LATHES  
15" AND 16"**

**12 Speed Geared  
Head Motor Drive  
Timken Mounted  
Spindle.**

**Modern Design—  
Liberal  
Dimensions.**



Write  
for  
Bulletin.

**THE CARROLL & JAMIESON  
MACHINE TOOL CO.**

SAVANA OHIO U.S.A.

el WG-4 has been developed by the Porter-Cable Machine Co., 300-2 Wolf St., Syracuse 8, N. Y. Said to be ideal for cleaning up sand and die castings, for jobbing machine shops and repair departments, as well as experimental departments, the machine includes an accurate platen which is located directly above the contact roll convenient for grinding stock flat and square after removing over the contact roll.



Porter-Cable Model WG-4 Wet Belt Surfacer

The Model WG-4 is equipped with a self-contained recirculating system and individual motorized pump. The 4-inch belt is driven by means of a 1 1/2 h. p. motor. Distortion, warping, checking, and cracking of workpieces are said to be eliminated.

**Thomas Open-End Bar Shear**

An open-end vertical bar shear which is available in ten sizes having ram pressures of from 25 to 300 tons is announced by the Thomas Machine Manufacturing

the Por-  
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ay, 1945

*Speaking of Manpower—*

**men do  
more work  
in less time**

**if they have a**

*Wells No. 8—*



Today's production schedules and manpower shortage make it necessary to provide workmen with every possible means of saving time and labor...and that's where Wells No. 8 Metal Cutting Band Saws fit into the picture.

They can be used as auxiliary equipment to eliminate the bottleneck at big saws. They reduce time-wasting movement of stock—instead, you move a Portable Wells to the job. Set-up and change-over time are saved by their simple operation and quick acting vise. On production cut-off jobs one man can operate 2 or more Wells saws. There is a spot in every metal-working plant for a Wells No. 8.

#### SPECIFICATIONS

##### WELLS No. 8

##### CAPACITY:

Rectangular 8"x16"

(Special

Guides) . 5"x24"

ROUNDS: 8" diameter

MOTOR: ½ H.P., A.C.  
or D.C.

SPEEDS: . Selective  
60, 90, 130 feet per  
minute.

WEIGHT: . Approxi-  
mately 750 pounds.

**Wells SAWS**  
THE WAY OF BETTER SAWS

**Wells**

*Products by Wells are Practical*

**METAL CUTTING  
BAND SAWS**

WELLS MANUFACTURING CORPORATION  
808 TYLER STREET, THREE RIVERS, MICH.

May, 1945

MODERN MACHINE SHOP 229

Co., Pittsburgh 23, Pa. Shearing capacities for rounds range from 1 to 3 inches.

According to the manufacturer, the open-end feature of the shear provides for quick and accurate handling of work, as well as for quick and easy changing of shear blades. The machine is adaptable for punching and plate and angle shearing. The ram is machined for attaching various types of punching units, including single, double, or triple gagged units, cluster punches, or floating punches.

The frame of the Thomas Open-End Bar Shear is constructed of rolled steel plate, with heavy steel throat section

welded into place. The multiple jaw type clutch features a positive automatic kick-out for stopping the ram at the top of its stroke. The flywheel is mounted on roller



Thomas Open-End Bar Shear

*For  
Fast, Accurate  
Metal-Cutting  
Use*



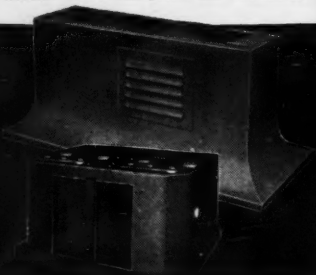
**KENNAMETAL** CEMENTED CARBIDE  
TOOLS, BLANKS, and MILLING CUTTERS



**KENNAMETAL Inc.**  
LATROBE, PA.

## MACHINE BASES

Why use expensive cast bases when Littleford can fabricate them from plate and sheet steel to fit all types of machines. Send blueprints for estimates.



**LITTLEFORD**

LITTLEFORD BROS., INC.  
433 E. Pearl St.,  
Cincinnati 2 Ohio

bearings and is located within the frame of the machine for safety and to eliminate overhang load on the bearings. The machine is V-belt driven to provide for quiet operation and reduce shock load on the motor.



**DRILL and  
PILOT  
BUSHINGS**  
Frictionless  
—Rotary

For core drilling, T. C. and high speed boring, turret tool, piloting, etc. Won't stick or clog. Dust proof as a watch.  
Write for details.

**GIERN & ANHOLTT TOOL CO.**  
1312 Mt. Elliott Ave. Detroit, Mich.

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L CO.  
t, Mich.

May, 1945

G I L M O R E

# Needle Point Diamonds

*For truing fine grained or sharp edge grinding wheels*

◆ Four different angles of conical point. 60° and 75° points for very delicate use. 90° and 120° points for general use. The narrow diamonds set in these tools stay reasonably sharp until completely used.



—Write for Catalog—

**F. F. GILMORE & CO.**

115 COLUMBUS AVE. BOSTON, MASS.



Magnified view of GILMORE NEEDLE POINT DIAMOND. Notice how deep the diamond is set into shank. This feature assures long wear and rugged use. Furnished in three sizes of holders. Discounts in quantities.



N-1: "Phonopoint,"  
Most popular size.



N-2: Dimensions,  
1/8" x 3/4".



N-3: Dimensions,  
3/16" x 1".

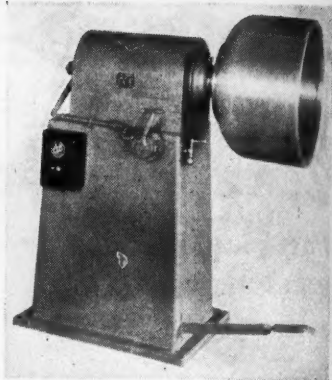
D I A M O N D S

## Schauer Air-Operated Variable-Speed Lathe

Single foot-pedal control of the entire work cycle is an outstanding feature of a heavy duty air-operated variable-speed speed lathe now being offered by the Schauer Machine Co., 2060 Reading Rd., Cincinnati 2, Ohio. Another feature includes the application of air operation to the work spindle, which has a 1-inch clear hole through it for handling rod or bar stock or long workpieces.

The Schauer Air-Operated Variable-Speed Lathe is designed to accommodate collets up to 1 3/8 inches maximum capacity. Step chucks, expanding mandrels, or special work-holding fixtures can also be used on the unit. The motor operates continuously. Pressure on the foot pedal closes the collet, releases the brake, and connects the motor to the work spindle through a Twin Disc clutch assembly. The air line is equipped with a control valve which provides for a time-lag before the collet releases the work.

Variations in spindle speeds are obtained through the use of a Reeves drive, with the control handle located convenient to the operator. Spindle speeds from a minimum of 100 r. p. m. to a maximum of



Schauer Air-Operated Variable-Speed Lathe

4,800 r. p. m. (in a ratio of 6 to 1 or 12 to 1) can be selected. The machine is designed for use in performing such secondary finishing operations as polishing, deburring, filing, or lapping metal and plastic parts.

## DESMOND GRINDING WHEEL DRESSERS



Desmond Hex Dresser



Desmond Heavy-Duty Dresser



Desmond Huntington Dressers

Our Desmond Huntington Cutters are made in all sizes.



We manufacture only complete line of dressers and cutters on the market, and will be glad to send samples for trial. Write for copy of our new catalog and name of your nearest jobber.



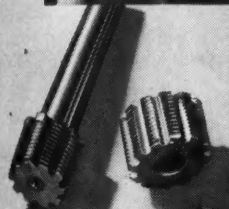
**THE DESMOND-STEPHAN MFG. CO.**  
URBANA • OHIO



# Do it with **DALZEN**



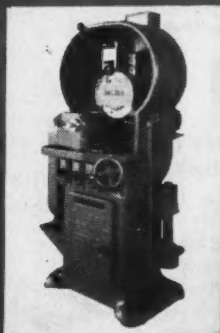
Left: Dalzen taps, U. S. Metric, Whitworth, and Special forms are precision ground of hardened high speed steel or tungsten carbide.



Left: High speed ground thread milling cutters, scientifically heat treated for longer life.

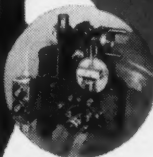
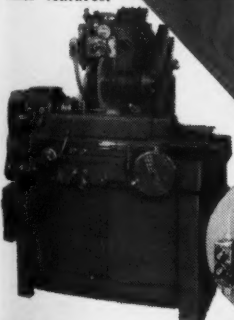
Dalzen manufactures an extensive line of precision cutting tools, parts, thread grinding and special machines—engineered for maximum efficiency and economical operation. Each is the result of years of experience on the part of designers and craftsmen. These are reasons why, all over the United States and in many foreign countries, master mechanics who have used and worked with Dalzen-made machines and tools say, "You can do it better with Dalzen." Write for details on how Dalzen can "do it better" for you.

Below: Dalzen "2-in-1" combines a dependable accurate center lapping machine with a sturdy drill press.

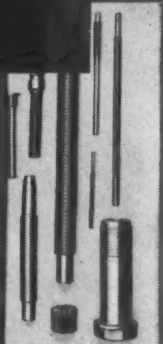


Right: No. 2 Thread Grinder. Compact, upright design saves floor space. Simple to operate. Low first and maintenance cost. Ideal for short or production runs.

Below: No. 5 Electronic Thread Grinder. High production efficiency and accuracy controlled by wheel speed, other features.



Right: Parts are thread ground exactly to your specifications. Rigid inspection assures a uniform fine finish. Threads also cut or rolled.



# **DALZEN**

## **TOOL AND MANUFACTURING CO.**

12255 EAST EIGHT MILE ROAD • DETROIT 5, MICH.

May, 1945

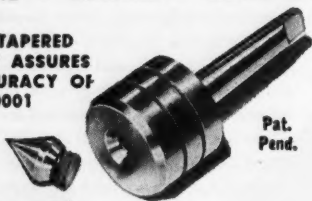
MODERN MACHINE SHOP 233

# Empire LIVE CENTER

With Interchangeable Points

ACCURATE • VERSATILE • HEAVY DUTY

THE TAPERED  
SEAT ASSURES  
ACCURACY OF  
 $\pm .0001$



Empire Toolmaker's  
Set available in  
wooden case—  
each tool in  
its own re-  
cess.

## Points for Various Operations

- A. Very large, for pipe or tubing work
- B. Extra long point used in facing operations
- C. Extra wide point for large diameter work
- D. Standard point
- E. Blank made of soft tool steel for nests
- F. Female for work not having centers

Send for Literature



Mfd. in all tapers,  
straight shanks,  
and specials

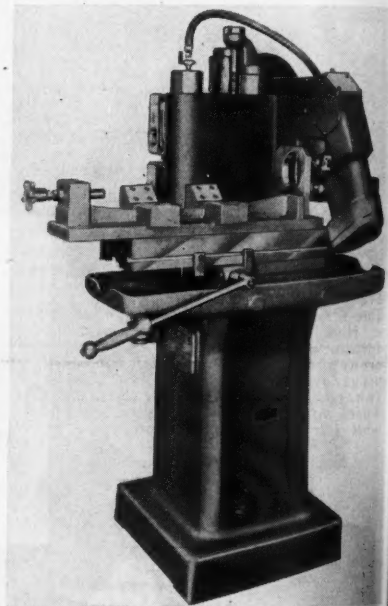


69 SPRING STREET • NEW YORK 12, N. Y.

234 MODERN MACHINE SHOP

## Kent-Owens Multiple Spindle Notching Machine

A multiple spindle notching machine for milling staking notches in rockets, shells, adapters, and similar parts has been placed on the market by the Kent-Owens Machine Co., Toledo, Ohio. A modification of the Kent-Owens No. 1-M hand miller, the machine, as shown, is equipped with a special head having three spindles, each carrying a notching cutter. These three cutters are equally spaced about the shell diameter.



Kent-Owens Multiple Spindle Notching Machine

The shell is located in a bore at the cutting end of the fixture as shown. A bayonet type clamp located at the rear of the fixture provides for rapid clamping and unclamping of the part. When milling notches in adapters, an air-operated fixture is used for holding the part.

With the Kent-Owens Multiple Spindle Notching Machine arranged as illustrated, three notches are milled simultaneously in the work, thus providing for unusually high production.

May, 1945

May, 1945

# THE *Carbide* AGE

ANOTHER OUTSTANDING WESSON CARBIDE RECORD

**MACHINE TIME: 16 TIMES FASTER—FLOOR-TO-FLOOR TIME: 4 TIMES FASTER**

**...AND ELIMINATING COSTLY GRINDING OPERATIONS**

Gains like the one reported here are conservative for WESSON carbides . . . hard, tough, molybdenum steel connecting rods for one of the world's foremost aircraft engine manufacturers are being channel-milled 16 times faster . . . grinding operation eliminated . . . saving time, manpower and grinding equipment . . . 5 to 6 times more rods before re-sharpening of cutter. (Single spindle, standard type milling machines used in both cases):

#### THE OLD WAY TOOL:

High Speed Steel End Mill  
**Speed:** 180 RPM. **Feed:**  $2\frac{1}{2}$ " per minute  
**Tool reground** after 8 to 10 pieces. **Finish,**  
**poor** . . . requiring grinding. **Average**  
**cutting time,** 10 minutes.

#### NEW WESSON WAY TOOL:

Specially designed WESSON Carbide-Tipped End Mill. **Speed:** 1400 RPM. **Feed:**  $12\frac{1}{4}$ " per minute. **Tool reground** after 50 pieces. **Finish, excellent** . . . no grinding needed. **Average cutting time,** 38 seconds.

Compare results . . . retool the WESSON way . . . WESSON engineers and their experience find valuable answers to tool problems. Phone, wire or write.

**WESSON COMPANY.**

**DETROIT 20, MICHIGAN (Ferndale Station)**



End view, showing carbide tip of WESSON End Mill



**WESSON**  
Carbide Cutting Tools

PIONEERS IN THE ART OF DESIGNING AND  
PRODUCING CARBIDE TOOLS

## Di-Acro Radius Brake

To meet the demands of aircraft manufacturers for a precision machine capable of properly forming duraluminum, chrome molybdenum, rust-resistant and spring tempered alloys, and various other low ductile materials essential in the fabrication and production of aircraft, the O'Neil-Irwin Manufacturing Co., 306 Eighth Ave. S., Minneapolis 15, Minn., has placed on the market the Di-Acro Radius Brake shown herewith. According to the manufacturer, the unit entirely eliminates the possibility of fracture or disintegration developing at the line of



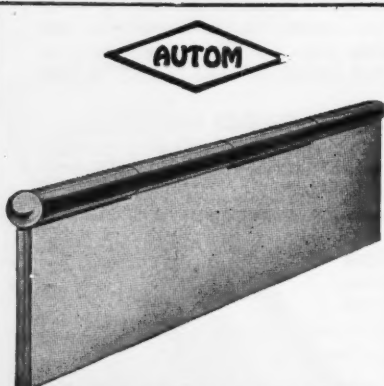
Di-Acro Radius Brake

forming while working materials mentioned above.

All contact surfaces of the Di-Acro Radius Brake are completely adjustable in all planes and to all angles, thus making it possible to obtain a true radius over the entire material width at the point of forming, regardless of the degree of angularity. Precision adjustable stops are provided for holding to die tolerances the degree of angularity in all duplicated work. Adjustment bolts are provided with lock screws.

The main bearings of the unit consist of cold rolled steel to gray iron and are adjustable for wear and alignment. The contact surfaces are readily removable for changing or replacing, and are made of cold rolled steel which is properly hardened and heat treated to resist wear.

Specifications of the Di-Acro Radius Brake are as follows: radii obtainable with standard forming plates, 0,  $\frac{1}{16}$ ,  $\frac{1}{8}$ ,  $\frac{3}{16}$ ,  $\frac{1}{2}$ , and  $\frac{3}{4}$  inch; maximum folding width, 12 inches; maximum full width folding capacity, 16 gauge steel plate; maximum degree of angular folding, 110 degrees.



## CONTINUOUS HINGES

Manufactured by

**AUTO MOULDING  
& MFG. CO.**

WRITE FOR STOCK LIST

2326 S. CANAL ST.

CHICAGO 16

## Johnson Adjustable Work Clamps

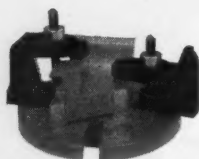
An all-purpose Clamp for lathes, milling machines, drill presses, and many other machines. Saves time and effort. Designed for speedy, accurate set-up and operating ease. Soon pay for their cost.

No. 1— $\frac{3}{8}$ " Bolt. Capacity  $\frac{1}{2}$ " to 2" from table or plate.  
No. 2— $\frac{1}{2}$ " Bolt. Capacity  $\frac{3}{4}$ " to 2" from table or plate.  
No. 3— $\frac{3}{4}$ " Bolt. Capacity  $\frac{1}{2}$ " to 4 $\frac{1}{2}$ " from table or plate.

Mfr's Agents: **JOHNSON & TIERNEY CO.**

P. O. Box 256, Pequannock, N. J.

Manufactured by W. E. JOHNSON CO., Pequannock, New Jersey



**JUST DRIVE THE PLUG!**



**There's no  
Regrinding  
of This  
STAPLES EXPANSION  
REAMER**

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May, 1945

To expand the Staples Expansion Reamer, you simply drive in the tapered expansion plug. As the tool body is solid—not split—you get uniform outward expansion. Cutting blades remain perfectly concentric.

For this reason Staples Expansion Reamers may be expanded several times without regrind. The simpler, more rigid Staples construction — patent protected — gives greater accuracy, more reamed holes per grind, longer tool life.

Staples manufactures a full line of reamers, spot facers, counterbores, and other Carboly-tipped circular cutting tools. Made originally to meet the precision standards of the aircraft industry, Staples Tools are now available for general use in the metalworking industry. Send for the Staples catalog of quality cutting tools, including standard tools available from stock.

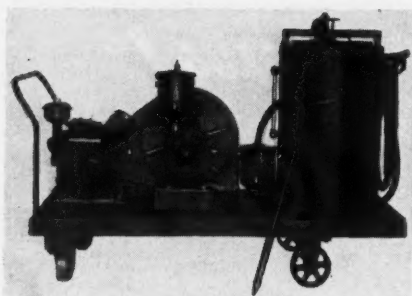
**Staples Tool & Engineering Company  
Cincinnati 25 . . . . . Ohio**

**Staples** CARBOLY-TIPPED CIRCULAR CUTTING TOOLS

REAMERS • CORE DRILLS • SPOT FACERS • COUNTERBORES • END MILLS •  
SHELL END MILLS • ALSO A COMPLETE LINE OF CIRCULAR SPECIAL TOOLS

May, 1945

MODERN MACHINE SHOP 237



Leiman Suction Outfit

## Leiman Suction Outfit

A suction outfit for use in removing the cleaning solution remaining in containers that have been washed out for refilling is now being made by Leiman Bros., 134-79 Christie St., Newark 5, New Jersey.

The outfit consists of a powerful rotary vacuum pump which is especially designed to create not only a high degree of vacuum but a sufficient volume of air to provide the necessary power to remove

the liquid residue instantly. The pump is available with either an electric motor or a gasoline engine and is equipped with a rubber hose and special suction tool. The truck on which the pump is mounted is equipped with wheels and a handle for moving about easily.

The liquid residue removed from containers is collected in a tank which is provided with a glass gage that indicates the amount of residue in the tank. The collected residue may be readily removed from the tank by means of a drain plug. The vacuum pump is automatically lubricated and is provided with a relief valve for regulating the degree of vacuum to be used.

The Leiman Suction Outfit is made in sizes for cleaning one, two, or more barrels or containers at one time.

## Sheffield Multichek

The Sheffield Multichek illustrated here with, product of The Sheffield Corp., Dayton 1, Ohio, is specially designed for the accurate and rapid checking of 21 outside diameters of a master camshaft. Each of the dimensions is indicated on

## MEASURING A PLUG GAGE with LIGHT WAVES using an optical flat, a toolmaker's flat and a gage block

The formula is:

$$D = h + (.000012 \times N \times W)$$

Substitute the actual values

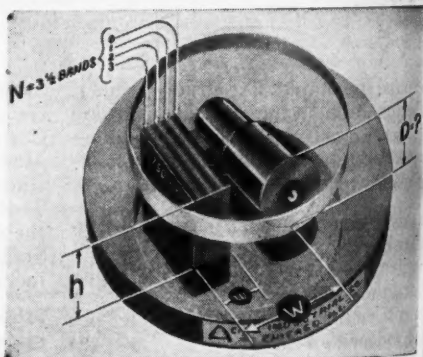
$$D = .750 + (.000012 \times 3\frac{1}{2} \times 1\frac{7}{16})$$

and get the answer

$$D = .750168 \text{ inch.}$$

**It's just that simple!**

Write for new, free Lightwave  
Measurement Booklet.



**ACME INDUSTRIAL COMPANY**

Makers of Standardized Jig and Fixture Bushings

212 N. Laflin St.

Chicago, Ill.

MONroe 4123



**SAVE TIME and THE USE of  
EXPENSIVE EQUIPMENT for**

## **KEYWAY CUTTING...**

# *The* **GLENNY** adjustable-expansion *Push* **BROACH**

**ON YOUR ARBOR PRESS  
WILL CUT KEYS**

**10 TIMES FASTER  
THAN A SHAPER**

Factories everywhere are replacing many keyway and slotting operations with the Glenny Broach on an Arbor Press or other tool. They report savings of 10 times—or better, with every piece accurate to  $\pm .0005$ .

### **One Keyway or Quantity Production**

Whether an occasional keyway or slot, or quantities, the Glenny Broach will save production time and costs.



**ACCURACY OF  $\pm .0005$   
ON EVERY PIECE**



**SEND  
FOR  
BULLETIN  
9**

$\frac{1}{4}$ " keyway,  
 $\frac{1}{16}$ " deep in  
Aluminum  
Sleeve. A quantity  
production  
operation.

Patent  
No. 2,184,383



$\frac{3}{16}$ " keyway,  
 $\frac{3}{64}$ " deep in  
Bronze Bush-  
ing. An important  
operation for  
Plane production.

**DEPT. B, EAST SHORE MACHINE PRODUCTS CO.**

835 EAST 140th STREET

CLEVELAND 10, OHIO, U. S. A.



Sheffield Multichek being used to gage outside diameters of a master camshaft

the diagram panel by means of light signals and all dimensions are checked simultaneously in one quick operation.

Each of the 21 Electrichek gage heads actuates a set of two individual signal lamps mounted behind a common port in the light case. Lights remain off when

the dimension is within tolerance limits. When a light bulb shows red, it indicates that the dimension is under the minimum tolerance limit, while a green light signifies that the dimension is larger than the maximum.

The operator need only watch one master light which remains off when all of the dimensions of the part being checked are within tolerance limits. If any one or more dimensions are either oversize or undersize, the master light comes on, and the operator refers to the diagram panel to see which signal light shows red or green to indicate the error.

The Sheffield Multichek can be obtained for checking any number of dimensions from two or more than 20.

## Aro Portable Pneumatic Drill

Featuring a one-piece aluminum housing, a powerful portable pneumatic drill which can be equipped with a  $\frac{1}{8}$ ,  $\frac{1}{4}$ , or  $\frac{1}{2}$ -inch Jacobs chuck is now being marketed by The Aro Equipment Corp., Bryan, Ohio. The drill is available in two models designated as the 100 and 100A, which are designed to operate at 2,500

# DEARBORN

## Automatic CHUCKING and INDEXING FIXTURES

### For Fast Milling and Drilling

Model C was designed to meet the demand of faster machining and accurate indexing of small pieces on bench and hand milling machines.

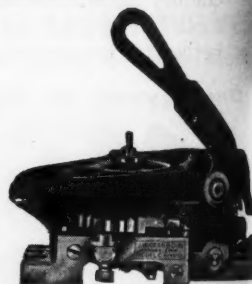
#### SPECIFICATIONS:

	Model B	Model C
Height to top of collet	5"	3½"
Center of collet to back of fixture	3½"	2"
Collet capacity	1" round	¾" round
Cuts per hour on free machining material	1000	1500

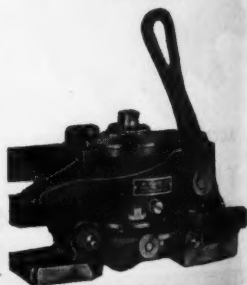
Work held by automatically opening and closing collets. Work automatically ejected. Indexes without loss of time for milling 1, 2, 3, 4, 6, 8, 12 or 24 sided pieces.

WRITE FOR FOLDER.

**J.W. DEARBORN** ANSONIA, CONN.



MODEL C



MODEL B

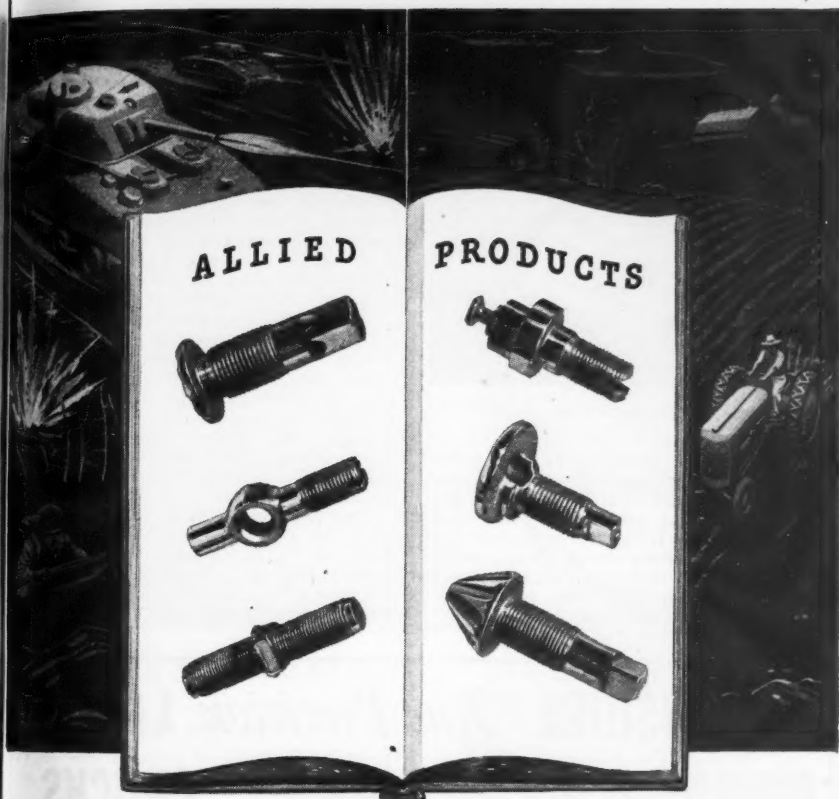
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Drill

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## Catalog for War and Peace

Here are a few of the cold forgings Allied now makes by the million for thousands of tanks, tractors, trucks and other articles of war. And Allied will make these same cold forgings *in quantity*, or cold forgings very much like them, for the trucks, tractors, cars and other machines that will carry on the good life of peace.

Produced by the thousands or by the millions, each Allied forging of each type is exactly alike, fitting even the finest tolerances. Forged in one piece, from a coil of steel wire, each embodies the strength,

flexibility of design and precise dimensions that make dependable quality synonymous with the Allied name. Some of the many products of Allied may solve your peacetime production problems. Anticipate those problems by consulting Allied today.

• • •  
**"IT'S AN ALLIED PRODUCT"** . . . Allied Products Corporation in its Richard Brothers and Victor-Peninsular plants in Detroit and Hillsdale, Michigan, makes cold forged parts, cap screws, sheet metal dies (from the largest to the smallest), R-B interchangeable punches and dies, steam-heated plastic molds, jigs and fixtures and special production tools.

## ALLIED PRODUCTS CORPORATION

Department 23  
4624 Lawton Avenue  
Detroit 8, Michigan

MODERN MACHINE SHOP 241

May, 1945

May, 1945

r. p. m. and are well balanced and constructed to withstand continuous use.

In addition to the one-piece aluminum housing, features of the Aro Portable



Aro Model 109 Portable Pneumatic Drill

Pneumatic Drill include a built-in oiler, four-blade rotor, hardened and ground cylinder, four-ball bearing construction, and precision-cut gears and gear cage. Standard equipment of the tool comprises a  $\frac{1}{8}$  or  $\frac{1}{4}$ -inch Jacobs chuck, chuck guard, and 8 feet of  $\frac{1}{4}$ -inch hose together with fittings. A  $\frac{1}{8}$ -inch chuck can be obtained on special order.

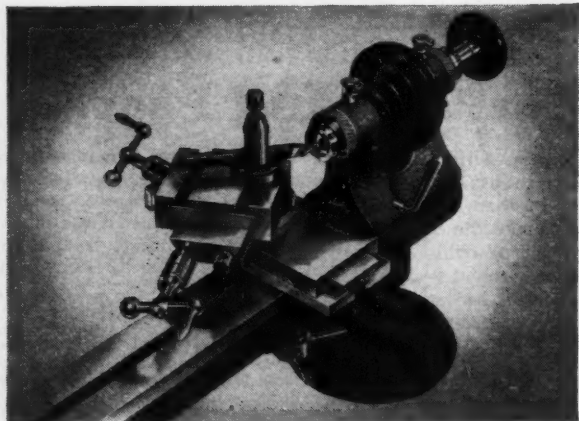
## "Logan" Sure-Flow Pumps

An improved line of centrifugal pumps, comprising 27 sizes and types and designated as "Logan" Sure-Flow Pumps, is announced by the Logansport Machine Co., Inc., 901 Payson Rd., Logansport, Ind. Although primarily designed for pumping coolants and cutting oils, the pumps are also adaptable for circulating cooling liquids, pumping or circulating water or quenching oil, and general liquid transfer service. Foot mounted, bracket mounted, flange mounted, grinder, and submerged types are available.

An outstanding feature of the Logan Sure-Flow Pump is the open impeller which is said to eliminate the need for close clearances or metal-to-metal contact of operating parts, thus allowing for pumping of liquids containing abrasives, filings, and other foreign matter. The pump is equipped with an integral motor drive which provides for great latitude in locating the pump.

The totally-enclosed ball-bearing motor used for powering the Logan Sure-Flow Pump is completely protected against splashing liquids, abrasive dust, and other harmful elements. The base, bracket, and flange mounted models em-

## DERBYSHIRE *Fine Precision* LATHES



## CHUCKS Attachments

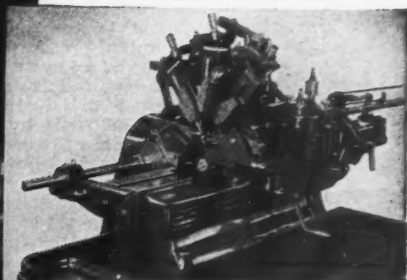
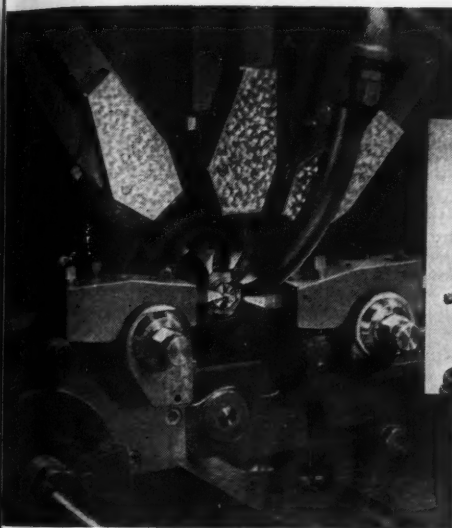
*Illustrated*  
DERBYSHIRE  
TWO-SLIDED  
SLIDE REST  
on  
MAGNUS  
LATHE

**F. W. DERBYSHIRE, INC., WALTHAM 54, MASSACHUSETTS**

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## NEW STANDARDS IN SCREW MACHINE

*finish-  
accuracy-  
speed*



### THE GIBBS AUTOMATIC

Do you want a finish on screw machine production comparable to fine finish grinding?

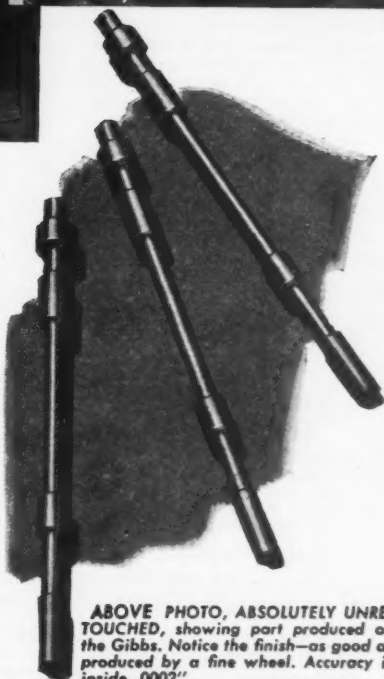
Do you want accuracy in diameter and concentricity, within .0002"?

Do you want production speed immensely aided by a machine so adaptable that second operations are unnecessary?

You get all these—and more in the Gibbs High Speed Automatic—the machine that turns small parts from bar stock, with five cam-activated, micrometer adjusted tool bits that operate close to the bushing through which the stock is fed. No box tools, no form tools, no indexing turret.

The operations can include not only turning, but forming, drilling, threading, reaming, knurling, counterboring, undercutting, tapping, slotting, spotting.

SEE THIS MACHINE in operation at the Scherr Demonstration Center (address below). Or write us for full information. If you wish, our screw machine consultant will be glad to visit you and check on the possibilities in your work.



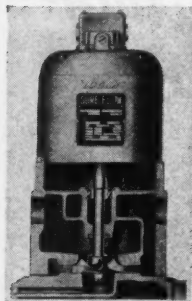
ABOVE PHOTO, ABSOLUTELY UNRETOUCHED, showing part produced on the Gibbs. Notice the finish—as good as produced by a fine wheel. Accuracy is inside .0002".

**GEO. SCHERR CO., Inc.**

198-A LAFAYETTE STREET  
NEW YORK 12, N. Y.

May, 1945

ploy improved rotary seals for protecting the motors and bearings from the liquid. The seals, which are said to effectively

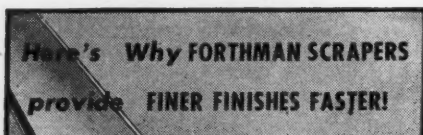


"Logan" Sure-Flow Pump

pump from reaching the motor bearings.

According to the manufacturer, rabbeted mounting of the motor housing of the Logan Sure-Flow Pump assures permanent alignment of pump and motor. The pump drive is direct through a single vertical shaft which operates in grease packed ball bearings.

prevent the entrance of air into the suction sides of the self-priming models, are self-adjusting, accessible for servicing, and are never subjected to the full pumping pressure, it is claimed. Grinder and submerged models have no seals but are each provided with an overflow hole in the top of the column which is said to prevent liquid within the



Here's Why FORTHMAN SCRAPERS provide FINER FINISHES FASTER!

Forthman Scrapers are tipped with super-hard CARBOLOY CEMENTED CARBIDE to resist wear and hold keen cutting edge over longer periods of continuous use! In terms of user benefits, this means

- ... longer scraper life!
- ... fewer interruptions for sharpening!
- ... finer finishes faster!

Furnished ground or unground. Write today for prices and specifications.

Manufactured by

**CLIFF J. FORTHMAN**

1633 Elkton Place • Cincinnati 24, Ohio

## State Dial-Set Boring Tool

Micrometer adjustment of the State Dial-Set Boring Tool shown herewith, product of the State Manufacturing & Construction Co., 1957 N. Dixie Highway, Franklin, Ohio, is accomplished through an eccentric cone and socket. With the vernier set at 0-0, the quill is exactly cen-



State Dial-Set Boring Tool

tered. As the vernier is turned, the quill is thrown off center through graduations of 0.001 inch to a maximum of 0.050-inch boring diameter.

The holder, which consists of a straight or taper shank, socket, and scale, is designed to accommodate a group of four or more inserts, the latter comprising a cone, vernier, quill and bit. The holder is standardly furnished with a round bit, however, carbide, diamond, and other special types of bits can also be supplied.

## Why THOR STAMPS Last Longer



... because they're made of a special, correctly-heated alloy steel. Central striking point assures uniform marking. Thumb side marking assures easy use.

You get more mark per dollar with THOR STAMPS. Write for catalog and prices.

**The Pittsburgh Stamp Co., Inc.**  
812 CANAL ST. • PITTSBURGH, PA.



# MOTORIZE

GEAR  
HOBBERS

MILLING  
MACHINES

DRILL  
PRESSES

LATHES

SHAPERS

BORING  
MILLS

ORIGINAL  
EQUIPMENT



*With*  
**LIMA**  
**GEARSHIFT**  
**DRIVES** *for*  
**MACHINE**  
**TOOLS**

*Capacities  
1 to 20hp.*

**THE LIMA ELECTRIC MOTOR CO.**

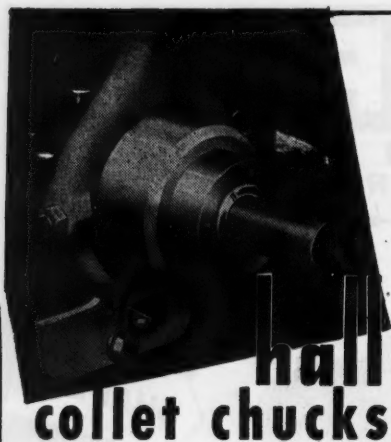
108 FINDLAY ROAD

LIMA, OHIO

REPRESENTATION IN MOST PRINCIPAL CITIES

LIMA GEARSHIFT DRIVES - LIMA ELECTRIC MOTORS  
LIMA MAGNETIC POLISHING LATHES - LIMA PEDESTAL GRINDERS





All grip—no slip . . . no bearings, friction, heat or lost power . . . push out type . . . full spindle capacity or over . . . automatic adjustment . . . work re-set without stopping lathe . . . 2 sizes, 1" and 2" capacities . . . order now with proper priorities.

**Immediate deliveries.**

**HALL MANUFACTURING COMPANY**  
Ph. NO 9679

622 Tularosa Dr. Los Angeles 26, Cal.

## Counterbores High Speed Back Spot Facers Core Drills Flue Sheet Cutters

**Interchangeable  
and Solids  
Also Specials**

**Write for Catalog**



**BICKNELL - THOMAS COMPANY**  
GREENFIELD • MASSACHUSETTS

Since the bit is held in the quill by a set screw a secondary increase in boring diameter can be effected by extending the bit. In the "A" kit, the combination of micrometer and bit adjustments provides boring diameters from  $\frac{3}{8}$  to 2 inches.

Despite its fine precision of adjustment, the State Dial-Set Boring Tool is said to be amply rugged for heavy production work on boring machines. Holders for use on such machines are furnished with die bases to simplify setting up operations.

## Waldes "Truarc" Internal Grooving Tool

Specially adapted for use by female operators in the precision boring of internal grooves for retaining rings and other purposes, an internal grooving tool which can be readily mounted in any standard drill press, turret lathe, or boring mill for operation automatically or by hand is now being manufactured by Waldes Koh-I-Noor, Inc., Long Island City 1, N. Y. Known as the Waldes "Truarc," the tool is said to operate smoothly by fingertip pressure. Scratching or marring of work is said to be prevented by the ball bearing housings holding the pilot housing.

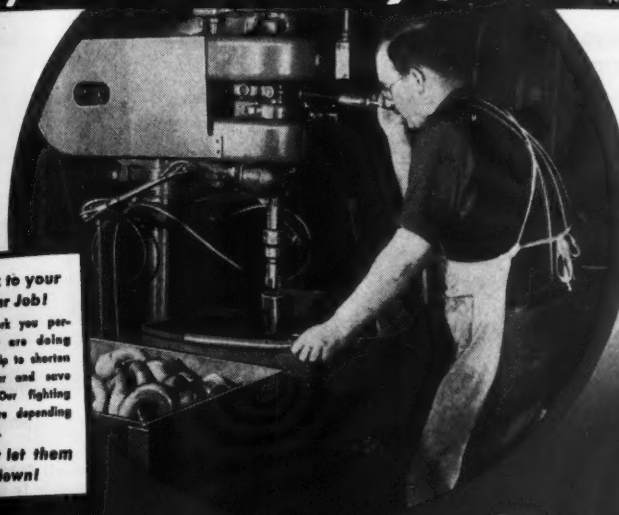
Additional features of the Waldes Truarc Internal Grooving Tool include accurate adjustment for spacing recesses from either top or bottom surface of the work; vernier thumbable for controlling the diameter of the groove; positive non-slip drive; and compact design which assures a minimum of overhang between the cutter and drill press or lathe bearings. The circular shaped cutters used in the tool are provided with tapered splined holders.



Waldes "Truarc" Internal Grooving Tool

# "Taps that Fill the Gaps"

...AND KEEP  
PRODUCTION  
ROLLING!



## Stick to your War Job!

The work you personally are doing may help to shorten the War and save lives. Our fighting men are depending on you.

Don't let them down!

Size of Thread being tapped, 1-31/32" — 16 NS; length of Thread, 11". Number of pieces per hour off drill press — 40. Number of pieces per hour in hand operation — 20. Photographs permitted by courtesy of Miller Mfg. Co., Detroit.

# MURCHEY

## SOLID ADJUSTABLE TAPS

TYPE "E" FOUR CHASERS • TYPE "R" SIX CHASERS

Sometimes a machine does not permit the use of a collapsible tap. Sometimes space is too limited. Sometimes sizing operations are required. When such circumstances arise, MURCHEY SOLID ADJUSTABLE TAPS solve the problem. Although not equipped with collapsing devices, they nevertheless have all the other advantages of a collapsible tap. They fill the gap between collapsible and solid taps. *Being adjustable*, correct decimal size is always maintained. Inserted chasers are readily removed for resharpening. Once you purchase the tap body, you can obtain a wide

variety of thread sizes merely by purchasing other chasers. The chasers, which are less expensive than solid taps, may be replaced when necessary. Write for complete descriptive literature.

## MURCHEY MACHINE & TOOL CO.

Detroit 26, Michigan

Murchey manufactures all types of Collapsible Taps, Self Opening Die Heads, Thread Milling Machines and Shell Tapping Machines. Write for catalogs. Address Dept. M-3.

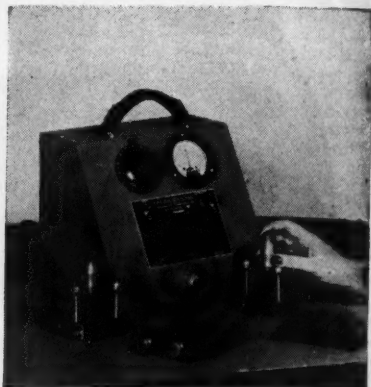
# MURCHEY

which fit a tapered shaft in the unit. Cutters for machining multiple grooves of any desired width in one operation can be obtained.

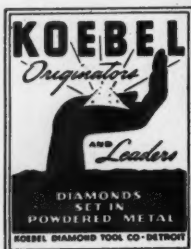
## G-E Redesigned Magnetic Comparator

According to an announcement made by the Special Products Division of the General Electric Co., Schenectady, N. Y., the G-E Magnetic Comparator, which provides a quick, simple, non-destructive

method of inspecting ferrous parts for quality control, has been redesigned to permit a more functional arrangement of its components. Desirable for testing



G-E Redesigned Magnetic Comparator



*Begin*  
with a **GOOD**  
**Diamond...**  
*Continue with*  
**Proper CARE!**

The ultimate cost of diamond tools is determined by the use—or abuse—they receive. Effective material on diamond tool care is available without obligation from Koebel Diamond Tool Co.

# KOEDEL

KOEDEL DIAMOND TOOL CO.  
9450 Grinnell Avenue Detroit 13

rods, bolts, springs, and small fabricated parts, this portable equipment is said to immediately discern variations in composition, hardness, or other characteristics which affect magnetic properties.

Features of the G-E Redesigned Magnetic Comparator include an attractive gray steel case with a sloping front panel on which are located an indicating instrument, variable-voltage transformer, and the necessary rheostats and switches. Graduated dial plates have been added to the sensitivity and balance control rheostats to allow duplication of the settings. In addition, a light is provided indicating whether or not the power is on. Receptacles for making connections to the test fixtures and power source are located at the back of the case, thus

## HYBCO GRINDING HEADS

For Universal Tool and Cutter Grinders.

### CHAMFER SHARPENING HEAD

Aggressively Relieves Chamfers of TAPS—STEP DRILLS—CORE DRILLS—COUNTERSINKS—similar tools with evenly spaced flutes.

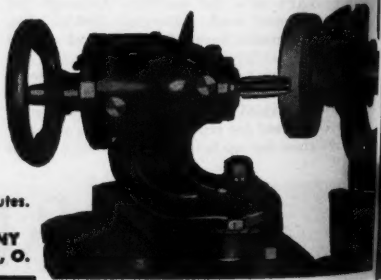


### FLUTE SHARPENING HEAD

Sharpens Straight or Angular Flutes—GUN OR SPIRAL POINTS OF TAPS—Other tools with evenly spaced flutes.

Write for Circular GH

HENRY F. BOGGIS & COMPANY  
1279 W. 3rd St., Cleveland 13, O.



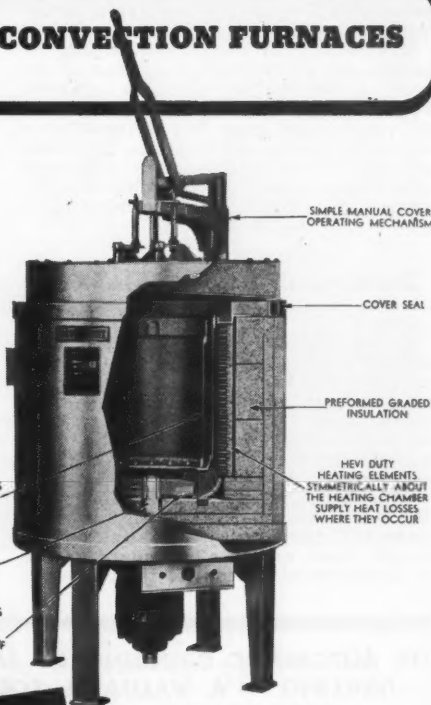
# HEVI DUTY *Pit Type* CONVECTION FURNACES

The Hevi Duty Pit Type Convection Furnace is used for aluminum heat treating, and for drawing and annealing ferrous and nonferrous metals up to 1400° F. (760° C.). The use of a high velocity fan assures uniform heating of the work even when the parts are small. This furnace can be built for use with protective atmospheres at temperatures up to 1750° F. (955° C.).

BASKET SIDE PROVIDES DEAD AIR SPACE TO PREVENT DIRECT HEATING

FAN AND SHAFT REMOVABLE THRU THE HEATING CHAMBER

LARGE FAN PROVIDES HIGH RATE OF CIRCULATION WITH UNIFORM HEATING OF WHOLE CHARGE



Cut-away view of an HD-1620 Pit Type Convection Furnace

Two large Hevi Duty Pit Type Convection Furnaces in an alloy steel fabricating plant.

*Send for  
Bulletin  
HD-1041*

## HEVI DUTY ELECTRIC COMPANY

HEAT TREATING FURNACES HEVI DUTY ELECTRIC EXCLUSIVELY  
MILWAUKEE, WISCONSIN

keeping wires out of the way of the operator and permitting a clear view of the indicating instrument.

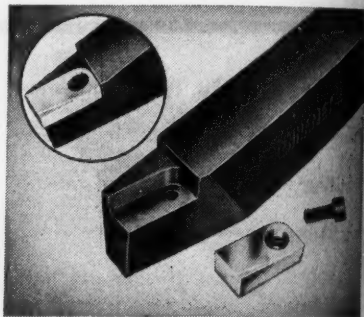
The redesigned comparator is said to incorporate all the basic functions of the previous model. The circuit is balanced by placing an acceptable part in each of the two test fixtures. One of these parts is then removed and those to be tested are individually inserted. Any deflection of the instrument pointer indicates a deviation in magnetic characteristics from that of the standard.

### Kennametal "Screwed-On" Tool Blank

Kennametal, Inc., Latrobe, Pa., has developed a tool blank having a drilled and counterbored hole to provide for attachment to steel shanks by means of a recessed head cap screw. The angularly-set screw serves merely to hold the blank against the recessed walls, which resist the main cutting thrust.

The Kennametal "Screwed-On" Tool Blank is available in several of the larger sizes, with formed clearance angles, right or left hand, and in all standard grades of Kennametal. Complete tools of vari-

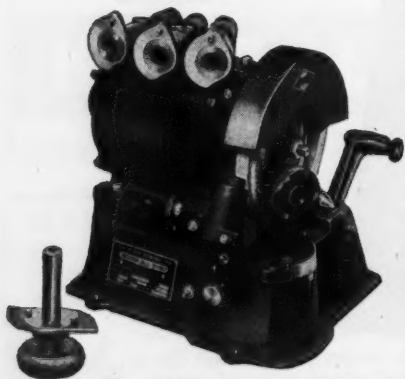
ous styles—straight edge, lead angle, offset, and so on—can be furnished with the screwed-on tips, or separate blanks can be supplied to individuals desiring to



Kennametal Style 11 "Screwed-On" Tipped Tool

make their own tools. Blanks of non-standard shapes and sizes may also be obtained for special tools, such as used in shell turning, form cutting of radii and grooves, and so on.

**ITS AUTOMATIC GRINDING OF SMALL DRILLS INSURES PRECISION DRILLING — A VALUABLE TOOL FOR ANY MACHINE SHOP**



## BLACK DIAMOND PRECISION DRILL GRINDER

Motor driven, these highly efficient Black Diamond Grinders are doing yeoman service on small drills in hundreds of large and small war plants throughout the nation.

They not only produce quantities of perfectly sharpened small gauge and fractional drills, with lips of uniform length, correct angle and proper clearance for true, accurate drilling—but they also release skilled mechanics for more important work.

The Web thinner, an important attachment, cares for the proper grinding of Notched, Cotton or so-called Crankshaft points . . . and the diamond dresser keeps the grinding wheel always sharp. Write for Bulletin 122.

## BLACK DIAMOND

**SAW & MACHINE WORKS, INC.  
NATICK, MASS.**



Easy hole burring  
from  
**ANY ANGLE**



**A** Nicholson 60° Cone Shape Rotary File in the chuck of a portable tool offers just about the handiest, "time-savingest" method there is for burring or countersinking holes in irregular or unwieldy castings. The file must, naturally, be of larger diameter than the hole.

This shape is also used for the second operation (removing bur) on screw machine when cutting inside threads.

Most important thing about Rotary Files is, of course, **quality**. It is the first thing Nicholson thinks about, for quality is the priceless heritage of 81 years of Nicholson adherence to high file-making standards. You can be sure that Nicholson Rotary Files—whether Hand Cut or Ground—are *right* in every respect: Manufactured from high-speed steel; carefully shaped and true-centered; accurately cut and expertly hardened.

**WRITE FOR CATALOG AND PRICE LIST**—and for any special information you desire. For deliveries, consult your mill-supply house.

**NICHOLSON FILE CO., 93 Acorn Street, Providence 1, R. I.**

(In Canada, Port Hope, Ont.)

## 16 STANDARD SHAPES

(in either Hand Cut or Ground). 3 cuts — Coarse, Medium, Fine.  $\frac{1}{8}$ " to 2" diameters.



Hand Cut



Ground

# NICHOLSON ROTARY FILES

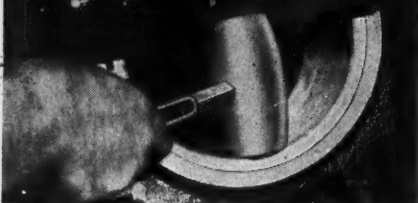
HAND CUT AND GROUND • FOR EVERY PURPOSE

**NICHOLSON  
U.S.A.**

## Tungtip Carbide-Tipped Inserted Tooth Milling Cutter

The accompanying illustration shows an inserted-tooth milling cutter of unusually rigid design which is now being offered by the Tungtip Division of Lowell & Grayson, Monrovia, Calif. The cutter consists of carbide-tipped teeth which are rigidly locked into the tool body without extraneous parts. The carbide-tipped tool steel inserts are provided with precision flat backs and serrated front faces to assure uniform clamping pressure over the entire length of the inserts.

The Tool with a Thousand Shop Uses!



Lead Hammer with "Shur-Grip" Handle in use at Reynolds Machinery Company, Ship Street Rebuilding Plant, Providence, Rhode Island.

### Johnson "SHUR-GRIP" Lead Hammer!

Day in, day out, there are countless jobs that call for a lead hammer. To save precious man hours, many times lost through costly hammer slips, equip your shop or plant thoroughly with SAFE Johnson "Shur-Grip" hammers. "SHUR-GRIP" handles give user a "bulldog" grip and are almost indestructible. "SHUR-GRIP" handles used only with Johnson 3, 4, 5 and 6 lb. lead hammers. For illustrated folder and price list, write Dept. M-1.

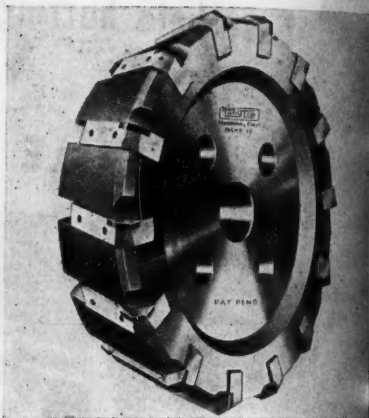
### JOHNSON TOOL COMPANY

LAWRENCE H. COOK, OWNER

PLASTIC MOLDS—TOOLS

66 MASSAHOIT AVENUE, EAST PROVIDENCE 14, R. I.

A simple adjusting screw mechanism provides for the precision adjustment of each insert to within 0.003 inch. Replacement inserts are provided with the face



Tungtip Carbide-Tipped Inserted Tooth Milling Cutter

of the carbide tips finish ground and the cutting edges rough ground.

The Tungtip Inserted-Tooth Cutter is available in face mill and half-side mill styles. The alloy steel body of the face mill is accurately counterbored in the back, thus providing a ground surface for accurate location of the cutter on the spindle nose of the milling machine. The half-side mill is provided with a precision ground arbor hole and hub face for accurately aligning for use in performing straddle milling operations. Both types of cutters are available with carbide teeth ground with corner angles or may be obtained with inserts ground with 90-degree corners for milling to a shoulder.

## HERCULES HOLDERS

Especially suited for parts numbering on steel, stainless steel and alloys, castings, brass, etc., these HERCULES Holders are available in both hand and press style, for one or two line convex or concave marking. No parts to loosen or wear out, type is instantly interchangeable by finger pressure on clip. Made of shock-resisting steel. Write for literature.



For simplified gang-stamping with faster interchangeability of type

## THE ACROMARK CO.

MORRELL STREET, ELIZABETH 4, NEW JERSEY

mechanism  
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Replace  
the face

# MULTIPRESS



A 4-TON "POWERHOUSE"  
IN SPACE-SAVING  
BENCH SIZE

Basic Unit **\$575.00**



Patents  
Applied  
For

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MULTIPRESS is the answer to an amazing  
of production needs in one compact,  
-saving unit! For example, it gives you:  
pressures from 300 to 8,000 pounds  
and you can closely limit them any-  
where in that range!

Length of ram stroke easily adjustable  
from 1/16-inch to six inches!

Ram speeds up to 200 inches per minute  
downward, and 300 inches per minute  
upward.

Full "feather-touch" control of ram travel  
and pressure at all times — plus many  
other controls.

Completely self-contained, motor-driven,  
hydraulic machine tool! Easily port-  
able. Delivered ready to connect and  
operate, after installation of a motor-  
generator.

Available for a wide range of standard acces-  
sories that further broaden the applica-  
tions of the basic Multipress.

MULTIPRESS is 16 inches wide, 26 inches  
deep, and 34 inches high, weighs only 725  
pounds, and has a table area of 10½ x 16  
inches, which can be increased to 10½ x 32  
inches with table extensions.

The ram responds instantly to the slightest  
movement of the control levers — may be  
lowered rapidly or slowly, or stopped any-  
where in its downward travel while the  
work is positioned beneath it. Pressures can  
be increased gradually or applied in full at  
once. The gauge shows pressures exerted on  
the ram in both tons and pounds per square  
inch.

Multipress fixtures are available for effi-  
cient high-precision straightening. Matching  
benches, table extensions, side shelves, a  
variety of bolster plates, and special ram  
action controls are also among the standard  
Multipress accessories. The Denison Engi-  
neering Co., 1153 Dublin Road, Columbus  
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simplify  
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Write for free 12 page Booklet



**DENISON**  
EQUIPMENT & APPLIED  
*Hydraulics*

May, 1962

**RIGHT  
TO  
THE  
POINT!**



From hardwood-handle to tempered-steel blade, every "Yankee" spiral screw driver is right to the point. Every part is ingeniously designed to speed work, cut down man-hours. Painstaking design and simple strength are typical of all "Yankee" fine mechanics' tools . . . whether Tap Wrenches, Vises, Automatic Drills, or Bit Braces. For more than fifty years, "Yankee" reputation for fast performance and reliability has grown steadily, is growing today, as "Yankee" tools help speed war production.

Order from your industrial supply distributor, or write North Bros. Mfg. Co., Dept. MMS-545, Phila., Pa.

"YANKEE" SPIRAL SCREW DRIVER No. 130A  
A Size for Every Purpose

**"YANKEE" TOOLS**

*make good mechanics better*

North Bros. Mfg. Co., Phila. 33, U. S. A.  
Established 1880

## Sturdy Boring Bar Adapter

An adapter whereby boring bars can be made to accommodate  $\frac{1}{4}$ ,  $\frac{3}{8}$ ,  $\frac{1}{2}$ ,  $\frac{3}{4}$ , and  $\frac{1}{2}$ -inch square bits is now being offered by Sturdy Broaching Service, 13414 Penkell Ave., Detroit 27, Mich. The adapter

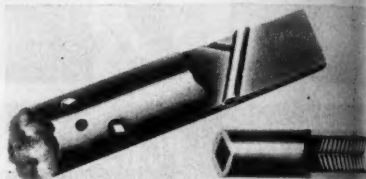


Illustration showing cutaway view of Sturdy Boring Bar Adapter, as well as cutaway view of a boring bar with adapter installed

consists of a round sleeve with a square hole broached through the center. One end of the hole is tapped for a back-up screw.

To install the adapter in a boring bar, a hole of the proper size is simply drilled and reamed in the bar at the desired angle and the adapter inserted in the hole. The adapter can be sweated, welded, or soldered into position. After the adapter has been positioned, a hole can be drilled and tapped through the sleeve and bar simultaneously for a set screw.

The Sturdy Boring Bar Adapter may be obtained finished to a standard size or the outside diameter or with approximately 0.015 inch grinding stock.

## Elgin Sapphire Plug and Ring Gages

Outstanding resistance to wear is the principal feature of the sapphire plug and ring gages now being produced by the Elgin National Watch Co., Sapphire Products Division, 932 Benton St., Aurora, Ill. In addition, the gages are said to be unaffected by any chemical ordinarily encountered in gaging and, it is claimed, cannot rust, burr, or become distorted.



Elgin Sapphire Ring Gage

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May, 1945 May, 1945

# WETMORE REAMERS

Fitted With Special "Ream-mor" Processed Adjustable Blades

## Quick Adjustment

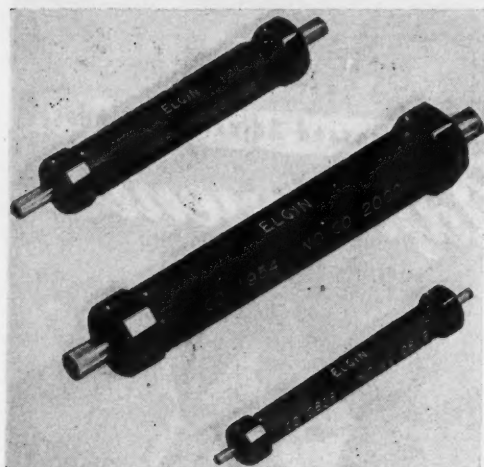


WRITE FOR CATALOG

### WETMORE REAMER CO.

24 North 27th Street, Milwaukee 3, WIS.





Because of their extreme hardness, the sapphire gages can be made in very small sizes to unusually close tolerances. The Elgin Sapphire Ring Gage is available in a size as small as 0.004 inch, while the Elgin Sapphire Plug Gage can be ob-

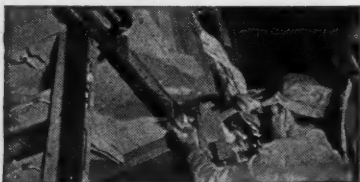
#### Elgin Sapphire Plug Gages in Plastic Handles

tained in sizes of from 0.040 to 0.400 inch. Tolerances of plug gages are said to range from 0.0001 down to 0.00002 inch. The plug gages can be furnished with plastic or flexible rubber handles.

#### Green Reamer Holder

Designed to permit the reamer to "float" in any manner necessary in order to align itself with the drilled hole, a reamer holder for automatic screw machines is now in production in an assortment of sizes at the Green Manufacturing Co., Rockford, Ill. The float principle of the holder is based on two synthetic oil-resistant rubber rings which allow for free but controllable motion in any direction, including ample lateral as well as pivoted motion. Thus, a smooth, round hole void of chatter marks and

### HARGRAVE Clamps



HARGRAVE Individually Tested Clamps are built with extra strength—to provide long years of trouble-free service. An unusually wide line of clamps in various sizes and patterns assures a clamp for every purpose. Stock sizes range from  $\frac{1}{4}$ " to 10" openings, from  $\frac{1}{2}$ " to 16" deep. See Your Supplier.

WRITE FOR CATALOG  
showing complete HARGRAVE Line.

**THE CINCINNATI TOOL CO.**

Founded in 1879

1947 Waverly Ave., Cincinnati 12, Ohio

The CINCINNATI TOOL CO.

## ROTARY FILES



CUT TIME



HAND-CUT  
ROTARY FILES

CUTTERS  
GROUND FROM  
SOLID

Write for Catalog

**MECHANICAL DIE & TOOL CO. INC.**

11 New York Ave.

Brooklyn, N. Y.



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oklyn, N. Y.

May, 1945

# CLECO TOOLS

for  
**TODAY'S JOB**  
and  
**TOMORROW'S**



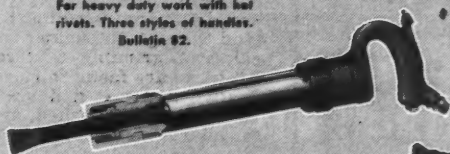
## ROTARY GRINDERS

Ruggedly built, extra powerful. Many sizes, with straight or spade handles. Bulletin 80.



## RIVETING HAMMERS

For heavy duty work with hot rivets. Three styles of handles. Bulletin 82.



## RIVET BUSTER

To cut off rivet heads, break down walls, drive spikes and small drift bolts. Bulletin 81.



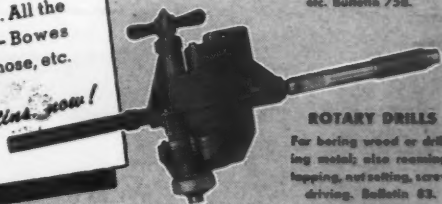
## WIRE BRUSHING TOOLS

Husky rotary machines, used with radial wire brushes or cup wire brushes. Bulletin 80.



## SCALING TOOLS

Mandy hammers for cleaning paint, weld splash, scale from metal surfaces, etc. Bulletin 758.



## ROTARY DRILLS

For boring wood or drilling metal; also reaming, tapping, nut setting, screw driving. Bulletin 63.

● Need tools for war work now? Or are you planning your requirements for post-war jobs? ... The complete Cleco line offers the right tool for many major operations. Fast workers, that take it easy on air consumption, Cleco Tools are the product of over 50 years experience in this field ... All the accessories, too — Bowes Couplings, valves, hose, etc.

*Write for Bulletins now!*

**THE CLEVELAND PNEUMATIC TOOL CO.**

3781 EAST 77TH STREET

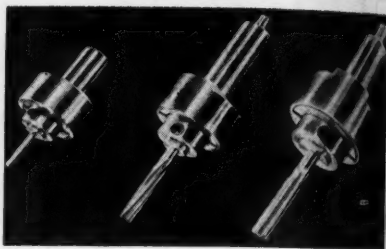
CLEVELAND 5, OHIO

Branch Offices in All Principal Cities

without bellmouth is said to be produced.

Once the float adjustment is set for a particular job, it will not change since there are no wearing parts or friction, it is stated. With all movement of the reamer head absorbed by the resilient rubber rings, shock on the cutting edge of the reamer and any tendency to chatter are said to be eliminated.

According to the manufacturer, the Green Reamer Holder is unusually simple to set up. A hollow set screw is provided for fixing the position of the reamer, and a simple spanner wrench, which is used to adjust a threaded compression



Green Reamer Holders

## DERBYSHIRE

Fine Precision

## WIRE CHUCKS



	Capacity
• MAGNUS-ELECT .....	.004" to .315"
• D. LARGE .....	.004" to .250"
• D. W. W. ....	.004" to .196"

STANDARD ACCURACY  
.0002" ECCENTRICITY

**F. W. DERBYSHIRE, INC.**

WALTHAM 54, MASSACHUSETTS

screw, allows for setting the tightness of float. Both of these adjustments can be made with the holder in working position in the machine.

Additional features of the reamer holder include a one-piece bushing which is said to eliminate difficulty resulting from mismatching or loss of parts, and a hollow shank that permits the reamer to extend through the holder so that no shortening of grinding centers is necessary. All parts are made to close limits of high quality material and are carefully heat treated, finely finished, and standardized for quick, easy replacement.

### Micro-Turnthread Attachment

An improved Micro-Turnthread Attachment for engine lathe work is now being manufactured by the Melling Tool Co. Box 37, Jackson, Mich. Designed for use in the fast and accurate production of a variety of turned and knurled parts, the attachment is self-contained and all parts are firmly mounted on one solid yoke. It is furnished in two models designated as "A" and "B."

The Model A is desirable for turning

V



THE READY TOOL CO.  
BRIDGEPORT CONN. U.S.A.

No. X 1-2-3-4-5

Write for Catalog S-45

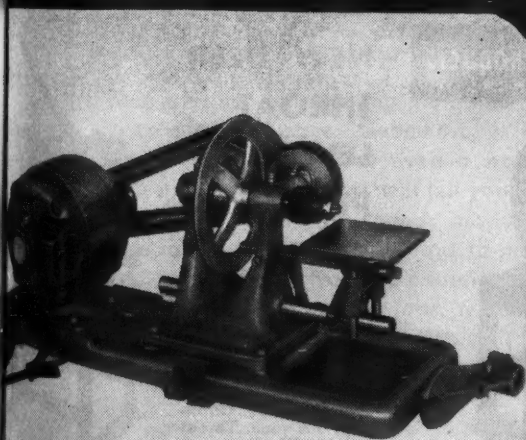
**THE READY TOOL CO.** 510 Iranistan Ave., Bridgeport, Conn.

**TRIPLES LIFE  
OF TOOL BITS**

A file hard tool steel bearing supports cutter and prevents wear at this vital point. Stops the breakage of tool bits.

# Rickert FOR 35 YEARS Shافر

## R-S Bench Style TAPPER THE ORIGINAL FRICTION DRIVE TAPPER



*for*  
**TAPPING  
GAUGING  
REAMING  
BUFFING**  
*etc.*

• Built in 3/16" and 5/16"  
sizes complete with motor,  
integral toggle switch and  
cord. Other models for belt  
drive in bench and pedes-  
tal mountings

**RICKERT-SHAFER CO. • ERIE, PA.**  
HEADS • COLLAPSIBLE TAPS • BORING HEADS  
TAPPING MACHINES • SPECIAL THREADING MACHINES

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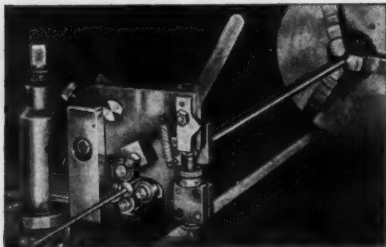
LIFE  
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f tool

t, Com.

May, 1945

long shafts and cutting National Acme threads on same. It is constructed with rollers at the right of the cutting tool so as to permit any length of stock to be



Micro-Turnthread Attachment in Use

turned true even though the stock may be out-of-round when beginning the cut. The Model A is arranged for securing the tool bit in the tool arm and can be furnished in two sizes for handling  $\frac{1}{8}$  to 1-inch and  $\frac{1}{4}$  to 2-inch diameter stock respectively.

The Model B utilizes quick-change self-locking toolholders. A change of holders

may be made in the brief time required to lift one from the locking post and place another on the device. The force of the cut locks the holder firmly in place, with the holder being easily freed for lifting off by twisting it away from the back stop. The Model B is furnished in two sizes for stock from  $\frac{1}{8}$  to  $\frac{1}{2}$  inch in diameter and  $\frac{1}{4}$  to 1 $\frac{1}{2}$  inches in diameter.

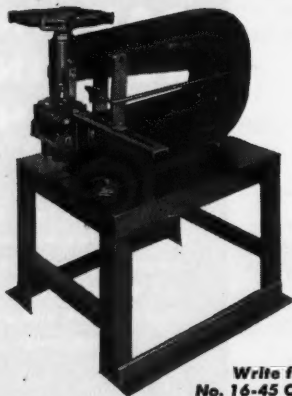
### Huppert Portable Pyrometer

Weighing only 1 $\frac{1}{4}$  lb., a portable pyrometer which is said to be particularly useful for determining the temperature of molten metals (exclusive of ferrous metals), hot air or liquids, and hot surfaces if utilized with a prod-type thermocouple is announced by the Instrument Division of the K. H. Huppert Co., 688 Cottage Grove Ave., Chicago, Illinois.

The design of the instrument is such that the scale is located at an angle that provides for maximum reading ease in all working positions and minimizes side reflections on the scale glass. In addition the unusual shape is said to lessen the danger of the scale glass coming in contact with other objects when the instru-

## WHITNEY-JENSEN PRODUCTS

30 YEARS EXPERIENCE



Write for New  
No. 16-45 Catalog.

**No. 26 and 27 DEEP THROAT PUNCHES** cover a wide range of work because of their throat depths, and heavy punching capacities. These punches are furnished with or without stands.

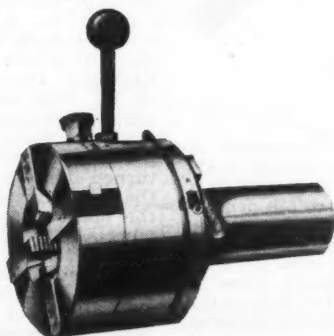
## NEW DEEP THROAT LEVER PUNCHES

Made in 7", 10", 18", 24" throat depths. All steel welded frame and sturdy welded steel stand. Powerful geared action. Capacity, 7 $\frac{1}{2}$  tons. Throat height, 6", die space 3 $\frac{1}{4}$ ". Standard equipment includes, depth and side gauges, punch holder, die adapter, die shoe and one punch and die. A sturdy versatile machine suitable for a wide variety of work.



**WHITNEY METAL TOOL COMPANY**  
110 FORBES ST. • ROCKFORD, ILL.

# Simplicity



## THAT ***SPEEDS*** PRODUCTION

Men who use self-opening die heads will tell you that the reason they choose "Geometric" is because of its "simplicity"—so simple that even a novice can operate it. Questioned further, they will tell you that this simplicity of design and operation speeds production and cuts down time lost in setting up, adjusting, re-placing, and re-sharpening. They speak from the experience of many years and many types of threading jobs. When tooling up for your next threading job, get in touch with

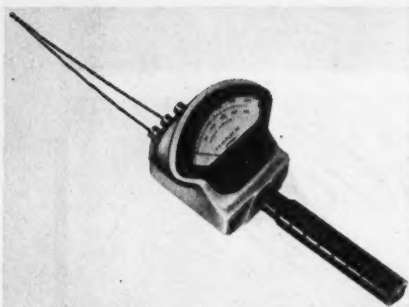
**THE GEOMETRIC TOOL COMPANY**

New Haven 15, Connecticut

A DIVISION OF THE GREENFIELD TAP and DIE CORPORATION







Huppert Portable Pyrometer

ment is placed in a resting position, therefore reducing glass breakage.

The Huppert Portable Pyrometer is standardly available with a duo scale that provides for readings of 0 to 500 deg. F. and 0 to 1000 deg. F., 0 to 550 deg. F. and 0 to 1,500 deg. F., or 0 to 1,000 F. and 0 to 2,000 deg. F. or equivalent degrees Centigrade. Instruments with other scales are available on special order. A zero adjustment screw on the face of the meter allows for manual room tempera-

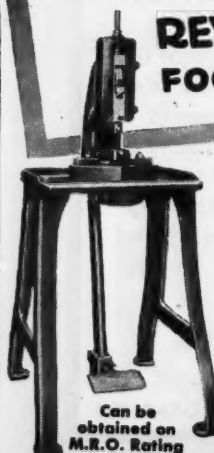
ture adjustment of the instrument, which includes a sturdy 6-inch handle that permits a firm, comfortable grip. In addition, the unusually light weight of the instrument minimizes wrist and arm fatigue.

### "Steelgrip" Refrigeration Puller

Designed for use on various types of refrigeration equipment, a puller which is available in either a two-arm or three-arm type is now being manufactured by Armstrong-Bray & Co., 5346 Northwest Highway, Chicago 30, Ill. The three-arm puller arms are cross bored to permit them to be turned sideways so that they can grip the spokes of flywheels. The hooks on the arms are made sufficiently long to permit a firm grip to be obtained on the work.



"Steelgrip" Refrigeration Puller



## REYNOLDS FOOT PRESS

**\$65 Complete as shown**  
**F. O. B. Providence (Crating \$5.00 Extra)**

**SPECIFICATIONS**

Full Length stroke	23 1/8"
Greatest distance from bottom of plunger to platen	5 3/4"
Length of Collar	1 1/2"
Distance between center of plunger and back of press	3 3/8"
Distance between centers of stud bolts	7 1/8"
Floor space	22" x 22"
Weight about	300 lbs.

Can be obtained on M.R.O. Rating

**REYNOLDS  
MACHINERY COMPANY**  
211 EDDY STREET PROVIDENCE RHODE ISLAND

## Immediate Delivery FROM STOCK GREAVES-SILENT BAKELITE GEARS



No waiting when you order Greaves Silent Bakelite Gears. • We have them in stock NOW! • Your order will go forward immediately. • You'll appreciate the silent operation and added smoothness provided by Greaves Silent Bakelite Gears. • You'll marvel at their great strength to carry big power loads... their remarkable ability to successfully operate completely submerged in water. • You'll welcome their low cost. • No metal reinforcements required. • Save Time... Money... Labor!

We also make silent gears of rawhide and Fabril.

Write for Circular.

THE *Greaves* MACHINE TOOL CO.  
2015-10 Eastern Ave.  
Cincinnati, Ohio



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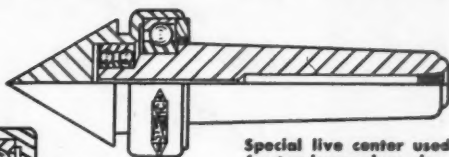
OL CO.

May, 1945

*Special*

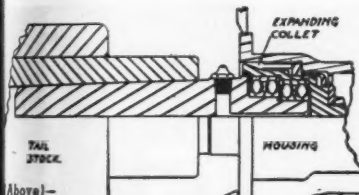
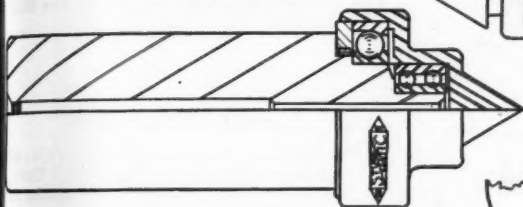
# Live Centers

Send us your specifications and blueprints—  
We will see that your  
job is set up with the  
right LIVE CENTER.

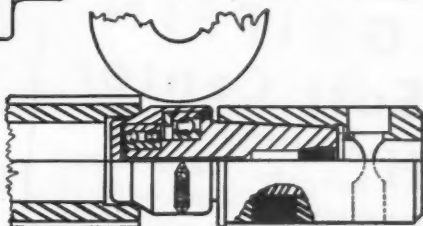


Special live center used  
for turning various sizes  
of tubing, pipe, etc.

(Left)—  
Special live center used  
in Warner & Swasey  
screw machines.

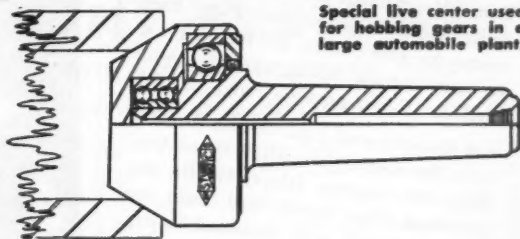


Above—  
for turning and facing  
rear axle housing,  
tubes on a center drive  
lathe using a live center  
on each end, machin-  
ing both ends si-  
multaneously.



Special live center used  
for hobbing gears in a  
large automobile plant.

(Right)—  
Special live center  
for turning extra  
large tubing.



Characteristic of the design of all STURDIMATIC LIVE CENTERS is a low overhang and a slight cushioning action . . . that compensates for expansion due to heat, shock and excessive thrust loads—reducing wear to a minimum. A properly engineered live center is one of the fundamentals of setting up a job and requires a specialist's experience . . . standard shanks with Morse taper carried in stock. Prompt deliveries on high priorities.

# STURDIMATIC

## TOOL COMPANY

5222 THIRD AVE. DETROIT, MICH.



*The Blade  
that Doesn't  
Shatter, Sag  
or Bind -*

## GRIFFIN Soft Center

**H**ARD-TEMPERED along the back—for reserve strength and stiffness where needed. Softer—but **TOUGH**—through the center, for flexibility and break-resistance. Extra hard teeth—for sure cutting and long service. A many-purpose blade, exclusive with Griffin. Widest possible range of uses.

Ask for it at your local Griffin distributor's. See also Griffin High Speed Steel Blade for toughest alloys; Griffin Molybdenum High Speed Steel, most economical cut-off tool obtainable today; Griffin Non-Strip hand blade for cutting thinnest sheet or tubing.

General Sales Agent

**JOHN H. GRAHAM & CO. Inc.**  
105 Duane St., New York 8, N. Y.

**•GRIFFIN•**  
*Hack Saw Blades*

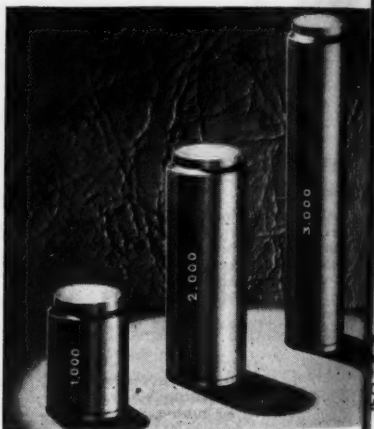
MADE BY G. W. GRIFFIN CO., FRANKLIN, N. H. • 1880-1945

The construction of the Steelgrip Refrigeration Puller is such that the greater the pull exerted on the work, the tighter the arms of the unit are said to grip the work. The arms and hub are drop forged and made of special analysis steel which is heat treated to provide for great strength.

The Steelgrip Refrigeration Puller is adaptable to diameters up to 6 inches and has a reach in from the end of the shaft of 5 inches.

## Yankee "Handi-Blox"

The Yankee Precision Products Co., 90 Farmington Ave., West Hartford 7, Conn., is now marketing a line of size blocks for



Yankee "Handi-Blox"

every day shop use, to be known as "Handi-Blox." Said to be accurate within 0.001 inch, the blocks are available in sizes from  $\frac{1}{4}$  to 4 inches and are made of solid carbide in the smaller sizes and carbide-tipped in the larger sizes.

## McGill No. 7500 Inside Inspector Lamp

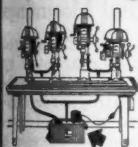
Especially designed for the inspection of inside surfaces of products in process of manufacturing, the McGill No. 7500 Inside Inspector Lamp shown herewith has

**Get the most out of every machine**



*use* **GRAY-MILLS** *portable*  
**COOLANT SYSTEMS**

**to prolong tool life ... improve finish ...  
increase production**



**DRILL PRESS**

Productive capacity of drill  
press increased by addition  
of this Gray-Mills  
Coolant System. Write for  
details today.



**DELTA CUT-OFF SAW**

Work is speeded up on  
this Delta cut-off saw by  
use of Gray-Mills system  
for supplying coolants.

On the lathes pictured above, and on other machines having no built-in coolant system—Gray-Mills Coolant Systems are the simple, effective and economical means of applying coolants or cutting oils. Used on grinders, drill presses, abrasive cut-off machines, lathes, metal cutting band saws, milling machines, etc., Gray-Mills Systems apply coolants in controlled volume, either constantly or intermittently. The increased production, longer tool life and improved finish that result will quickly pay for these easily installed, inexpensive Gray-Mills Coolant Systems.

Available in a variety of models, and with complete pans and fittings, for every requirement. Write for details and prices.

**GRAY-MILLS CO., 1948 Ridge Avenue, Evanston, Illinois**



*Complete Portable*  
**COOLANT SYSTEMS**

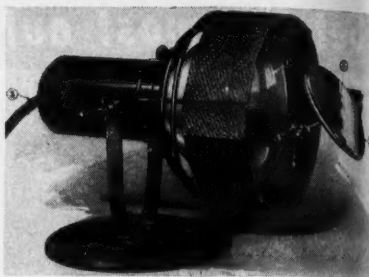
**FRACTIONAL H. P. PUMPS • PARTS CLEANING SYSTEMS  
INDUSTRIAL FLUID REFRIGERATING SYSTEMS**

May, 1945

MODERN MACHINE SHOP 265

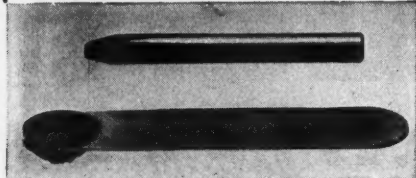
been placed on the market by the McGill Manufacturing Co., Inc., Valparaiso, Ind. The lamp is said to be particularly useful for the inspection of shells, cavities, castings, tubes, and other objects with deep openings.

To eliminate squinting or eye straining on the part of the inspector, the No. 7500 lamp is constructed so that the inside of the article being inspected is brought out clearly in the adjustable mirror of the unit. A strong light is thrown inside the cavity and the operator simply adjusts the mirror to a point where he can see clearly without assuming a bent or



McGill No. 7500 Inside Inspector Lamp

## 'BURR-OFF'



For Removing Burr or Chamfering  
Holes and Slots of Fork-Shaped  
Parts.

EFFICIENT • DURABLE • SIMPLE  
INEXPENSIVE

TOOL IMPROVEMENTS CO., INC.  
SEAFORD, NEW YORK

General Sales Agents:

JOHN H. GRAHAM AND CO., INC.  
105 Duane St., New York, N. Y.

cramped position and without undue eye strain.

The McGill No. 7500 Inside Inspector Lamp has a 100-watt, 120-volt rating and is supplied complete with a No. R-40 spotlight installed, adjustable mirror, 12-foot insulated cord with plug, and adjustable wing nuts to allow for tilting light and also for mirror adjustment.

## Insulated Aircraft Cowl Mountings

Recent additions to the line of insulated bushings and mountings marketed by Bushings, Inc., 3442 W. 11 Mile Rd., Berkeley, Mich. are cowl mountings for military aircraft which are made of synthetic rubber that is said to possess a high rate of vibration and shock absorption and to be impervious to decomposition by oil.

An additional feature claimed for the bushings, which are available for radial engine aircraft cowls, is unusual resistance to heat due to the method of assembling the metal inner and outer shells of each bushing with synthetic rubber. The shells are assembled without the aid

## SAVE THOSE OLD TAPS. REGROUND THEM

Used on tool and cutter grinders — surface grinders — even bench lathes. Taps sharpened after center is destroyed. No collets. Complete. No extras. Write!



RESHARPEN  
DULL TAPS  
PROMPT  
DELIVERY.

READING MACHINE COMPANY  
READING (CINCINNATI), OHIO

## BROACH KEYSEATER

The Reading Bench Machine does not require bushings or guides. Very fast capacity from  $\frac{1}{8}$  to  $\frac{1}{2}$  cutter. Low first cost.



or Lamp

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Inspector  
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Mountings

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May, 1945

May, 1945



# ACCURACY WINS



GAGES • SPECIAL TOOLS  
REAMERS • MILLING CUTTERS  
END MILLS • FORM RELIEVED  
CUTTERS • COUNTERBORES

**FALCON TOOL CO.**

12502 GREINER • DETROIT 5, MICHIGAN

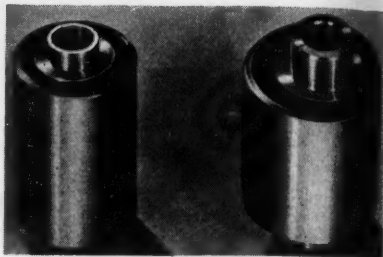
WIRE FOR DETAILS AND DELIVERY DATA—  
WE'LL GIVE YOU QUICK ACTION!

MODERN MACHINE SHOP 267




of vulcanizing, the bond between the metal and synthetic rubber being a mechanical rather than a chemical bond. Thus, heat, it is claimed, does not affect the mounting until temperatures beyond safe operation have been reached.

The employment of a mechanical rather than a chemical bond is said to allow for the use of virtually any combination of rubber or synthetic with such widely diversified materials as plastics, steel, brass, powder bearing materials, and so on. Moreover, the elements of the assembly, it is claimed, do not have to be symmetrical since the method of manufacturing



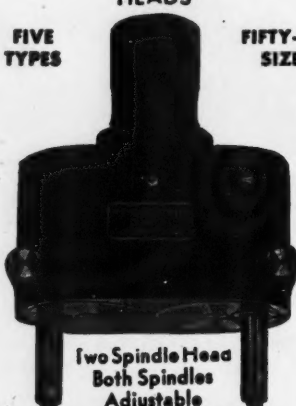
Insulated Aircraft Cowl Mountings

the mountings can be employed equally well with component parts of virtually any size or shape.

STANDARD  SINCE 1915

HEADS

FIVE TYPES FIFTY-SIX SIZES



Two Spindle Head  
Both Spindles  
Adjustable

United States Drill Head Co.  
Cincinnati 4, Ohio

## Master Redesigned "Streamline" Steel Tape Rule

The accompanying illustration shows the Master Redesigned "Streamline" Steel Tape Rule now being made by the Master Rule Manufacturing Co., Inc., 834 E. 136th St., New York 15, N. Y. Compact as a pocket watch and handsomely finished in chrome, the rule includes a full  $\frac{1}{4}$ -inch claw tip which enables the user to operate beyond arm's reach and to caliper any round object with a diameter of up to approximately 1 inch.

In the event of damage, the blade can be readily replaced without instructions by means of a screw driver. The smooth, straight case top is said to form a frictionless channel through which the blade can be easily slipped without marring the graduations. A lever locking device conveniently located at the back of the case permits any blade setting to be held for quick and easy reading. The braking



Actual Size Photo  
3 Carat Size—Common  
 $\frac{1}{16}$ " Shank—\$36.00 ea.

**LOC-KEY-SET**  
by Patented Process  
U. S. Pat. 2,351,741

**16**  
Factory Branches  
Jobbers  
Everywhere

# DIAMONDS for Production

**RE-SET-ABLE • BIG-HEAD-NIB**  
(Trade Marks Registered)

Equip Now  
with  
**"RE-SET-ABLE"**

Diamond Tools  
on Your  
Precision Grinding  
Production Line



● **RE-SET-ABLE** adds to life of your diamond  
... More work per carat. Exclusive patented setting is tender to the diamond ... Holds firmly ... Protects from damage ... Guards against breakage.  
**No. 24 CN RE-SET-ABLES** are now selling in 100 lots. Ask for easy No. 4 Catalog and Grinder's Instruction Card. Shows sizes to fit your machines. Tools backed by service unequalled.

All diamonds are **LOC-KEY-SET** for immediate shipment ... Tools numbered in units of  $\frac{1}{4}$  carat (No. 1 size) and lettered to denote quality of diamond and style of mount ... 3 grades—Common (C), Medium (M), Select (S). (24-hour resetting service \$1.00 postpaid.) Bigger stones in C grade are genuine economy in diamond use. For large wheels we recommend No. 60-CN.

SHELDON M. BOOTH, Pres.  
**DIAMOND TOOL COMPANY, Not Inc.** 988 E. 41st Street CHICAGO 15, Ill.



The

# OLIVER DIE MAKING MACHINE

*Saves 50% to 60%*

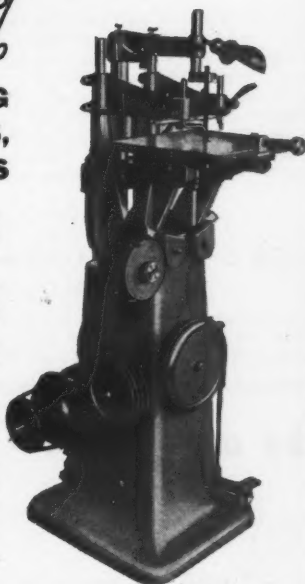
**OF THE COST OF MAKING  
EXPENSIVE DIES, GAGES,  
TEMPLATES and CAMS**

This versatile machine is equipped with every useful device for the rapid production of dies and similar tools.

It has capacity for sawing and filing in metals up to 3" in thickness, and filing still heavier materials with a shorter stroke. Stroke is adjustable from 0" to 5" and 6 speeds are provided from 100 to 300. Sawing can be handled to the center of a 20" circle.

Table is 14" square, tilting 15° to the right, left and front, and 3° to the back.

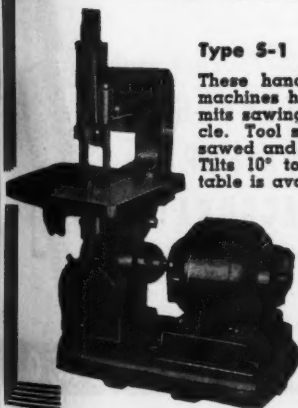
Hydraulic feeding device provides constant controllable pressure on the down stroke of ram and relieves pressure entirely on up stroke. Feeding pressure is adjusted so that if left to itself, will feed a short distance and stop, preventing inadvertent work spoilage.



## OLIVER OF ADRIAN

### Type S-1

These handy bench type die making machines have 8 1/4" throat, which permits sawing to the center of a 17" circle. Tool steel up to 1" thick may be sawed and filed. Table is 10" square. Tilts 10° to right, left and front. 16" table is available at extra cost.



### OLIVER INSTRUMENT COMPANY

1430 E. Maumee St.

Adrian, Mich.

*We also build Drill Grinders, Tool and Cutter Grinders, Face Mill Grinders, Template Tool Bit Grinders.*

*Let us send bulletins giving full information on Oliver die making machines. Prompt deliveries offered.*

MODERN MACHINE SHOP 269

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May, 1945

May, 1945



Master Redesigned "Streamline" Steel Tape Rule

surface of the lock extends the full width of the blade itself and is twice as long as formerly, thus enabling the tape to be held so firmly that all creeping or slipping is said to be eliminated. Improved visibility of figures provides for the elimination of all guesswork on inside measurements. Readings are claimed to be identical from every possible angle.

### CCA Six-Way Air Filter with Water Trap

A compressed air line filter having six outlets in the manifold and a self-dumping water trap which automatically

disposes of water filtered out of air lines has been added to the line of CCA (controlled compressed air) filters manufactured by Filters, Inc., P. O. Box 471, Glendale, California.

The outlets of the filter are  $\frac{3}{8}$  inches in diameter to accommodate snap-on hose connections. The self-dumping water trap includes a closed type float which is said to assure positive opening and closing of the discharge valve. The trap is arranged for easy servicing, and interior parts are heavily plated to reduce rusting to a minimum.

According to the manufacturer, the CCA Six-Way Air Filter with water trap prevents dust, rust scale, oil, and water



CCA Six-Way Air Filter with Water Trap

## Why are *Mac-its* used on Extra Tough jobs?



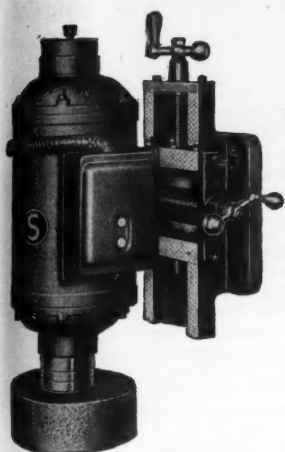
Because . . .

**Mac-it** Process makes  
them **STRONGER**  
more **UNIFORM**  
more **ACCURATE**

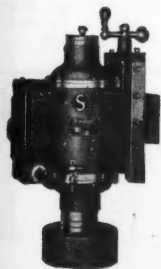
Mac-it Products Include: Socket Head Cap Screws, Hollow Set Screws, Hexagon Head Cap Screws, Square Head Set Screws, Stripper Bolts, Hexagon Socket Pipe Plugs



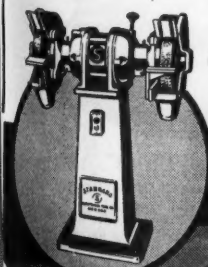
**STRONG, CARLISLE & HAMMOND CO. - Cleveland 13, O.**



Grinder with Vertical and Horizontal feeds. Available with or without feeds, as preferred.



Grinder with vertical feed and special mounting pad. All models have integral mounting pad for rigidity.



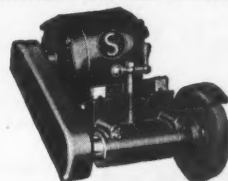
**"RIGHT! YOUR MACHINE TOOL CAN NOW SERVE YOU AS A (STANDARD) GRINDER TOO."**

**YES SIR!** You can now make your machine a "double purpose" machine, the "Standard Way." Standard Vertical Spindle Grinders and Standard Internal-External Grinders can be easily mounted on your Planers, Boring Mills, Shapers, Milling Machines, etc., giving you added profits!

**VERTICAL SPINDLE GRINDERS:** Sizes range from:  $\frac{1}{2}$  H.P. to 15 H. P. for straight or cup wheels up to 18" diameter. Also for cylindrical wheels, or segmental wheel chucks. Speeds: 1200, 1800, and 3600 R.P.M.

**Write for Your copy of Catalog 43, today.**

#### Internal-External Grinders



A 2-in-1 precision Tool. You can grind externally, and in a few minutes mount an interchangeable quill for internal grinding up to 24" deep. Sizes:  $\frac{1}{4}$  H.P. 4" Wheel to 10 H.P. for 20" Wheel.

**The STANDARD ELECTRICAL TOOL Co.**

CINCINNATI - 4 - OHIO

2487 RIVER ROAD

MODERN MACHINE SHOP 271

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May, 1945

May, 1945

from entering air tools, thus prolonging the life and increasing the efficiency of such equipment.

## New Britain Reversible Ratchet Wrench

Product of The New Britain Machine Co., New Britain, Conn., the reversible ratchet wrench illustrated herewith in-



New Britain Reversible Ratchet Wrench

cludes a unique, double-tooth engagement feature. Well balanced, the positive reversing action of the wrench can be seen and felt immediately. All working parts of the tool are said to operate freely and smoothly.

The New Britain Reversible Ratchet Wrench is made in all standard sizes.

## REYNOLDS COOLANT UNITS ARE EFFICIENCY EXPERTS!



Showing Reynolds No. 1-S attached to milling machine

Designed to promote peak performance in machines using a coolant (cutting or soluble oils), Reynolds Coolant units are the answer to demands for increased production and longer cutting tool life.

**REYNOLDS MACHINERY CO.**

211 EDDY STREET, PROVIDENCE R. I.

## Stadoil Diamond Lapping Oil

A diamond lapping oil which is said to be specifically designed to eliminate the loading and glazing of diamond wheels and laps in sharpening carbide tools is now being produced by the Stadoil Manufacturing Co., 3221 S. Figueroa St., Los Angeles 7, Calif. According to the manufacturer, only tool and holder pressure are required on the wheel or disc when using Stadoil for sharpening.

Stadoil Diamond Lapping Oil is available in  $\frac{1}{2}$ -pint; 1-pint, 1-quart, and  $\frac{1}{2}$ , 1, 3, or 5-gallon containers.

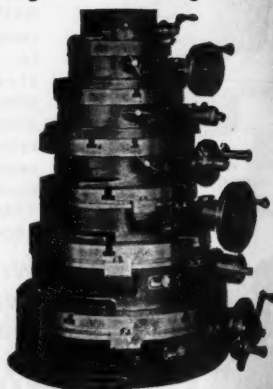


Stadoil Diamond Lapping Oil

## Quik Clamp Dog

A quick-acting positive grip dog for use in holding parts that are to be ground between centers is now being

## Troyke Rotary Tables



Sizes 9", 12", 15", 18"

Ask your dealer or write us for eight page catalog.

**ALFRED A. TROYKE**

4422 Appleton St.

Cincinnati, Ohio

# SENTRY *Diamond Block* METHOD

## Hardens Tools Scientifically by Controlled Atmosphere

Diamond blocks inserted in the furnace gradually consume and combine with air to generate a rich, protective atmosphere. That's the Sentry Diamond-Block method of "Controlled Atmosphere". Fully automatic. Needs no adjustment or attention by operator. Unskilled hands easily produce quality work.

Molybdenum, Tungsten, Cobalt — any High Speed Alloy Steel or High Carbon High Chrome Steel — can be hardened quickly, to correct hardness and stay true to size, in this Sentry High-Speed-Hardening Furnace.

Heats rapidly — 2350F, in about an hour.

Ideal for tool rooms. No fumes. Quiet. Clean.



- Low Cost
- No decarburization
- No soft skin
- Scale-free
- Maximum hardness
- True to size

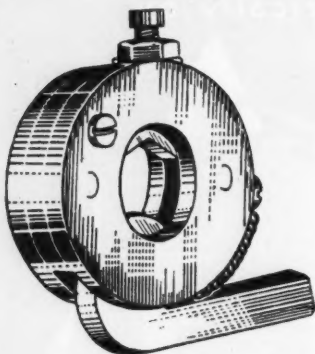
Send samples for demonstration or write for  
Bulletin 1012-6E.



**The Sentry Company**  
FOXBORO, MASS., U. S. A.

marketed by the Quik Clamp Mfg. Co., 6313 Capulina Ave., Morton Grove, Ill. Designed to eliminate the need for a

range of sizes for work diameter up to 2½ inches. Dogs for lathe work can also be obtained.



Quik Clamp Dog

screw driver or wrench in applying, the dog features an adjustable jaw for accommodating several sizes of shafts.

Applicable to soft or hardened shafts, the Quik Clamp Dog is available in a

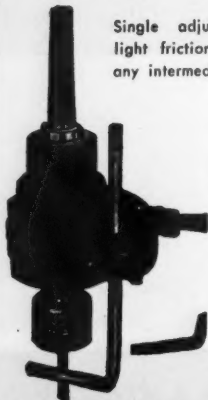
## Kodak Transfax Process

A process for reproducing working drawings on flat surfaces, to be known as the Kodak Transfax Process, is announced by the Eastman Kodak Co., Sensitized Goods Sales Division, Rochester, N. Y. The process involves the use of a liquid (Kodak Transfax Spray) which is coated on the metal or other non-porous material, such as plastic or rubber, providing a light-sensitive surface on which working drawings can be printed directly. The drawings are reproduced as white-line positives which guide fabrication of the material on which they are printed.

The Kodak Transfax Process is said to be extremely simple. The sensitized metal, in contact with the drawing, is first exposed to bright light and the exposed areas are then washed from the metal with a weak solution of warm ammonia water, followed by a spray of tap water. All steps can be carried out in ordinary room lighting.

Metal treated with Kodak Transfax

## TAP HOLES 2-56 TO 1" WITH DORMAN Tappers



Single adjustment changes from light friction to positive drive or any intermediate.

No. 1 tapper, friction or positive, drives 2-56 to ¾" tap in steel or any other material.

No. 2 positive tapper drives ¾" to ¾" tap in steel or any other material.

No. 3 drives ½" to 1" in steel or any other material.

Delivery from Stock

Some Sizes.

Write for details

**DORMAN MACHINE TOOL WORKS**

357 CANAL ST. • NEW YORK 13, N. Y.

## BRADFORD METALMASTER LATHES

14½" - 16½" - 18½" Swing

TOOLROOM AND ENGINE TYPES

.. Also ..

CAM FEED

UNIT TYPE

DRILLING AND

TAPPING  
MACHINES



1840 - 1944

**The Bradford Machine Tool Co.**  
Evans at 8th St. Cincinnati 4, Ohio





## ...PRECISION...

After running 100,000 pieces on production, a MARVECO LIVE CENTER tackled an emergency tool job. It qualified because its run-out was only .0001. That's persistent precision, a MARVECO characteristic.



The MARVECO is GUARANTEED to OUTPERFORM and OUTLAST any other LIVE CENTER.

*Send us your*  
**CENTER PROBLEMS**

Our illustrated catalog will be sent upon request. See for yourselves the MARVELS or MARVECO.

**MARVEL TOOL AND MACHINE CO.**

10979 W. JEFFERSON AVE., RIVER ROUGE 18, MICHIGAN

Spray is said to withstand bending, shearing, and punching without loosening the coating and, provided the metal does not scale, the coating will, it is claimed, resist the application of a cutting torch up to the point where the molten metal carries it away.

## Trico Leakproof Air Gun

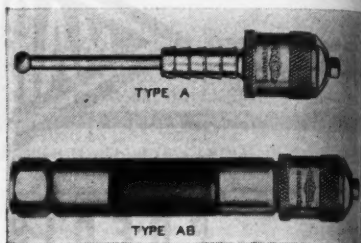
A leakproof air gun for use in blowing chips, dust, and dirt, ejecting finished parts, and operating air-driven tools,



TYPE HOLDERS AND TYPE ROLL MARKERS  
HAND STAMPS LOGOTYPES DIES STANDARD  
AND SPECIAL STAMPS INSPECTORS STAMPS  
MACHINE ENGRAVING PRECISION DUPLICATING

**NEW METHOD STEEL STAMPS, Inc.**  
149 Joseph Campau, Detroit 7, U.S.A.

such as vises, clamps, chucks, presses, and so on, is now being produced by the Trico Fuse Manufacturing Co. 2943 N. 4th



Trico Leakproof Air Guns

St., Milwaukee 12, Wis. A slight finger-tip flex of the hose provides for the discharging of a small puff or full blast of air as desired. Air pressure aids in closing the ball and socket valve of the gun tightly when finger-tip pressure is released.

The Trico Leakproof Air Gun is available in two types designated as the "A" and "AB." The Type A is designed for permanent applications, while the Type AB is recommended for remote control applications and is attached directly to the air pipe line and operated by hand, knee or foot control, treadle, pulleys, cams, plungers, and so on. The gun can be obtained in sizes to fit air hose of various diameters.

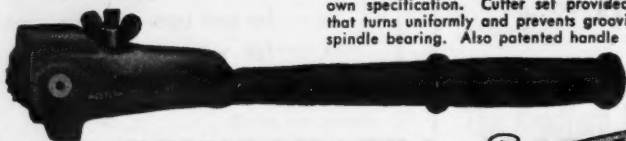
## Pheco Plastic Processing Pot

A plastic processing pot developed especially for use with ethylcellulose protective stripping compound and incorporating facilities for constant tem-

EVERY ONE A CHAMPION  
**CHAMPION**

## EMERY WHEEL DRESSER

A mechanically correct dresser with cutters made of steel of our own specification. Cutter set provided with revolving sleeve that turns uniformly and prevents grooving of spindle. Patented spindle bearing. Also patented handle cap that serves as bearing clamp, eliminates set screws and eliminates moving parts that wear.



The Champion Dresser will outwear many cheaper dressers... a fact proved for years by thousands of shops.

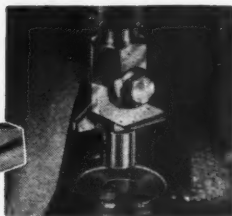
THE WESTERN TOOL  
AND MANUFACTURING CO.  
SPRINGFIELD, MASS.

# WHY USE 63 WHEN 9 WILL DO?

9 sizes of Clark Adjustable Counterbores cut all fractional diameters from  $\frac{1}{4}$ " to  $5\frac{1}{2}$ ".

Each does the work of 7 or more fixed-radius cutters, thereby reducing tool inventory costs considerably. They are particularly suitable for tool rooms, where tool and die makers are constantly needing counterbores of different sizes.

Recommended surface speeds are faster, and without chatter. Exclusive, burr-preventing interchangeable pilots available from  $\frac{3}{16}$ " up, by sixteenths.



No de-burring of pilot holes necessary with Clark Counterbores.



Clark Counterbores spot face as well as bore.

Clark Adjustable Counterbores are easily expanded. Simply loosen the locking bolts and slide cutting blades in or out. Blades are removable for sharpening.

CLARK CUTTERS

*Robert H. Clark Company*

9330 SANTA MONICA BOULEVARD  
BEVERLY HILLS CALIFORNIA

For complete information, call your Clark Cutter Jobber today or write for catalog MMS5-CB

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May, 1945

MODERN MACHINE SHOP 277

## ARGUTO OILLESS BEARINGS

USED  
ALL OVER THE WORLD

... IN MANY DIFFERENT  
APPLICATIONS

"OUTWEARS THE BEST  
BRONZE METAL"



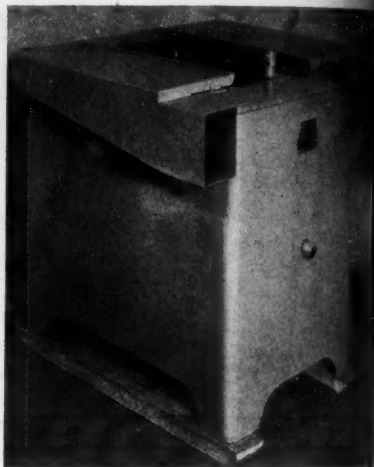
ARGUTO OILLESS BEARING CO.

WAYNE JUNCTION

PHILADELPHIA

perature regulation and heat distribution is announced by Carman Adams, 15476 James Couzens Highway, Detroit 21, Mich. The compound pot includes multiple control circuits, thus permitting zoning. All zones are individually controlled.

The Pheco Plastic Processing Pot, according to the manufacturer, is splash proof and has an adjustable tempera-



Pheco Plastic Processing Pot

ture range of from 100 to 400 deg. F. The unit utilizes electrical heating exclusively and includes many safety features.

### Seymour Smith "Snap-Lock" Plier-Wrench

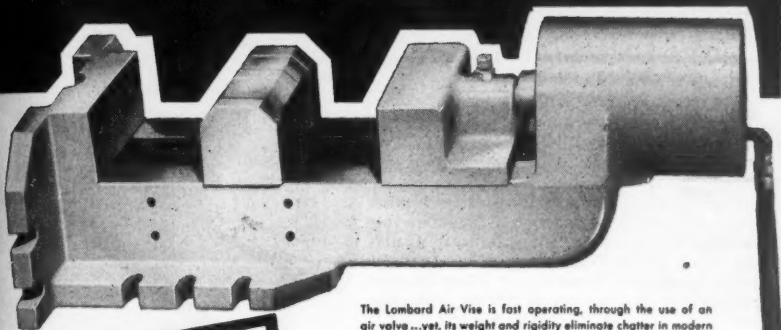
Production of a dual-action hand tool to be known as the "Snap-Lock" Plier-Wrench is announced by Seymour Smith & Son, Inc., Oakville, Conn. The tool can be used as a plier, as a pipe or monkey wrench, and as a hand vise or clamp. The jaw spread can be quickly adjusted, and, when desired, the handles can be snap-locked into permanent holding positions.

According to the manufacturer, the jaws can be released and reset repeatedly without altering the original adjustment. The jaws are corrugated and the bottom

# Heavy duty LOMBARD AIR VISE

20 TO 1 AIR LINE PRESSURE RATIO

A New, Precision Built, Holding Fixture Designed for Shopwide Use—  
ELIMINATES EXPENSIVE MILL FIXTURES and COSTLY SETUPS—  
WHICH SOON PAY FOR YOUR LOMBARD VISE



## Use this Vise for

### MILLING MACHINE

Equally adaptable to either horizontal or vertical milling.

### RADIAL DRILL

Jaw pressures up to 3,000 pounds hold part true for precision work.

### BORING MILL

Can be used in both horizontal and vertical setups.

### PLANNER

Both the weight and tremendous pressure of the jaws adapt this vise to production planing.

### ASSEMBLY

A quick-acting holding fixture for all types of assembly

The Lombard Air Vise is fast operating, through the use of an air valve...yet, its weight and rigidity eliminate chatter in modern milling machine methods—including, negative rake cutting with carbide tools. It is particularly adaptable to production runs of larger type castings or forgings, and for gang milling numerous small parts in a single operation.

### "FLOATING" CENTER JAW

This feature supplies the utmost flexibility in the Lombard Air Vise. Use the one jaw supplied or additional jaws depending only on the size of the parts to be held within the 12" span of the jaw

### SPECIAL JAWS TO HOLD UNUSUAL SHAPES

Special attachments or jaws may be made in your own tool room, or the Lombard Machine Company will manufacture them either to sample parts or to your prints and specifications.

### SPECIFICATIONS

Overall length, 29½"—Overall width at base, 15"—Height, base to top of jaws, 7½"—Weight, 185 pounds—Depth of jaws, 3¼"—Width of jaws, 7" Jaw Capacities: Two openings, each 4½", using center jaw furnished—Open capacity 0" to 12" Pressure Ratio: Twenty times air line pressures. 100 pounds air pressure develops 2000 pound squeeze—Working line pressure tested to 250 pounds. Material: Meehanite metal castings, machined to close tolerances. Valve, air lines and gages furnished with vise.

MANUFACTURED BY

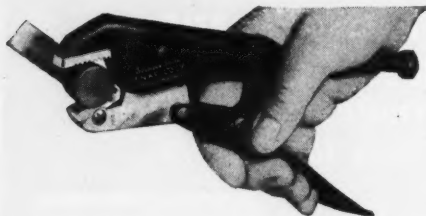
## LOMBARD MACHINE COMPANY

502 DOUILLARD • LOS ANGELES 31, CALIFORNIA • Capitol 1-1109

CHICAGO REPRESENTATIVE: FEDERAL MACHINERY SALES COMPANY

9 SOUTH CLINTON STREET

one is swiveled on a fulcrum to ensure a full grip the entire length of the jaw regardless of whether the object being gripped is flat or irregular in shape. The



Seymour Smith "Snap-Lock" Plier-Wrench used in turning pipe cap

body of the tool consists of heavy gauge pressed steel, while the jaws are made of hardened tool steel and are readily replaceable.

In addition to use in loosening frozen nuts, extracting cotter pins, unscrewing pipe caps and nipples, the Seymour Smith Snap-Lock Plier-Wrench can be used in clamping metal, plastic, or fiber sheets together for drilling or scribing, splicing

wire, holding a short piece of hack saw blade for sawing in close quarters, setting studs, holding pieces in position for soldering and welding, and so on. The tool is made in 7 and 10 inch sizes.

### Powersteel Tool Bit

Introduction of a solid cast steel tool bit to be known as the Powersteel is announced by Crobat, Inc., 1346 N. Main



Powersteel Tool Bits

St., Ann Arbor, Mich. The tool bit is produced by melting a special cobalt steel alloy in an indirect arc rocking electric furnace, super heating to well above 3,000 deg. F. and casting in a mold of the approximate bit size desired. The process is said to result in a tool bit that retains its cutting ability over long periods of use. Powersteel Tool Bits are supplied har-



## CUTTERS

**For Flat Bars  
Rods • Angles  
Wire Rope**

**MADE IN THREE SIZES:**  
The sturdiness and dependability of these cutters reflect our more than 50 years of experience.

**T. H. LEWTHWAITE MACHINE CO.**  
317 East 47th St.      New York 17

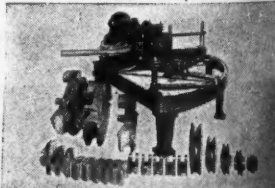
## "American"

### Cold Pipe, Conduit and Tube Bending Machines

Twelve types to select from. Hand operated capacities 1/4" to 6" inclusive. Motor operated 1/2" to 8" inclusive.

A few of our More Than 12,000 Customers:  
Bureau of Ships, Wash., D. C.; Henry J. Kaiser Co., Pacific Bridge Co.; Bethlehem-Hingham Shipyards; Hercules Powder Co.; Stone & Webster; E. I. Du Pont de Nemours & Co.; Westinghouse Elec.; General Motors; Henry Ford Co.

Write Air Mail for printed matter



**American Pipe Bending Machine Co.**  
25 PEARL ST., BOSTON, MASS.



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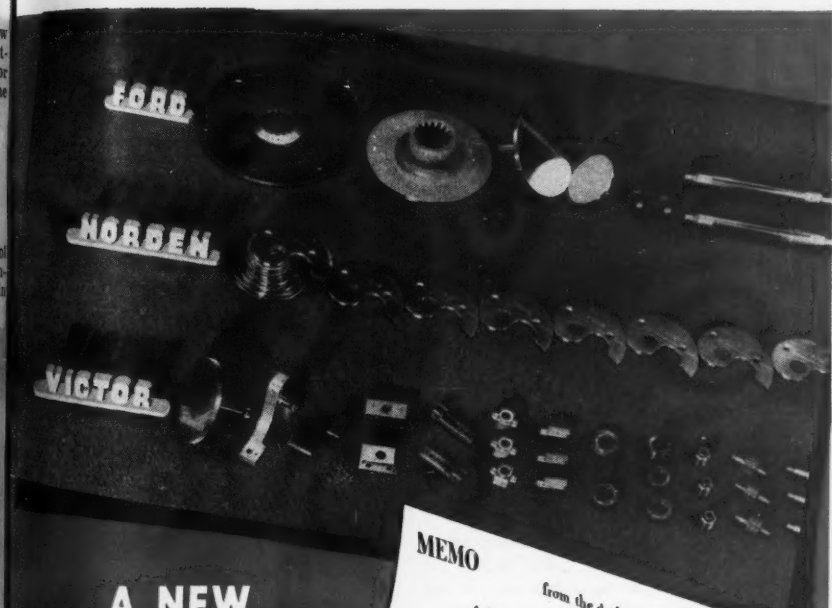
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Machine Co.  
MASS.

May, 1945



# A NEW SERVICE *by* **VINCO**

## MEMO

from the desk of the Exec Vice President  
Att. Advertising Dept

### PRECISION PARTS ON A PRODUCTION BASIS

This is an important subject - mass production of precision parts is a serious problem in many plants - Stress fact that we produce precision parts on schedule in quantity, to exact specifications - Should interest Mechanical Industries greatly  
Photo is ample proof that "Millionths of an inch for sale by VINCO" is a working slogan worth investigating.

*W. J. Schaeffer*

**MILLIONTHS OF AN INCH FOR SALE BY VINCO**

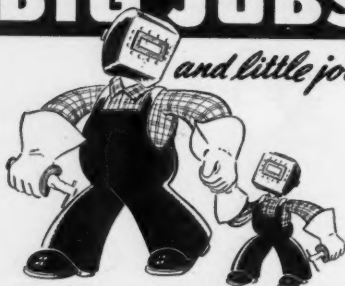
REG. U. S. PAT. OFF.

VINCO CORPORATION, 3861 SCHAEFER HIGHWAY, DETROIT 27, MICHIGAN, SALES OFFICES, NEW YORK CHICAGO, CLEVELAND

Semi-Automatic Hydraulic Spline and Gear Grinder • Optical Master Inspection Dividing Head • Involute Checker • Angle Tangent to Radius Dresser  
• Index Plates • Precision Vises • Sine Bars • Straight-side Spline, Serration Spline, Involute Spline and Helical Spline Plug and Ring Gages • Thread  
Plugs, Rings and Setting Plug Gages • Spur and Helical Master Gears • Muntion Gages • Propeller Hub Gages • Built-up and Special Gages • Gear  
Rolling Fixtures • Spline and Index Fixtures • Hydraulic Power, Control, Utilization and Distribution Units • Engineering, Design and Development

# BIG JOBS

*and little jobs*



*Go Hand in Hand*

WITH  
**MARQUETTE**

REGISTERED U.S. PAT. OFFICE

**A.C. ARC WELDERS**

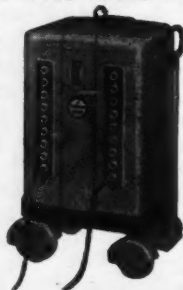
All the power you need for welding heavy parts, dies and machinery... and perfect arc control for welding light metal gauges, jigs and fixtures. With Marquette's matchless welding power you can readily "pour it on"... and without troublesome "magnetic blow" to hamper production.

Cast iron, malleable castings, aluminum, in fact, every size and type of metal, no matter what the job, Marquette A. C. Arc Welders will turn out strong, good looking welds faster and at less cost. Excellent for hardsurfacing tools and dies. These features make it the ideal welder for the Modern Machine Shop.

10 Models,  
125 to 400 Amps.  
Completely Equipped.

**BUY THE BEST...  
BUY MARQUETTE**

Send for free 24 page  
illustrated booklet.



**MARQUETTE  
MFG. CO., Inc.**  
Minneapolis 14,  
Minnesota

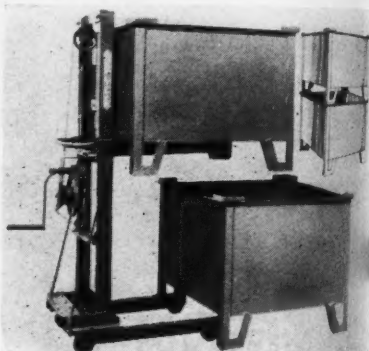
**MARQUETTE**  
REGISTERED U.S. PAT. OFFICE

**WELDING  
Equipment**  
ELECTRODES AND SUPPLIES

dened and ground, ready for use, and can be resharpened and used as long as they can be held in a holder. They are available in nine standard sizes of square bits and five sizes of rectangular bits.

## Palmer-Shile All-Steel Storage Bin

Especially designed for use in the handling of small parts in the course of production, an all-steel storage bin of the



Palmer-Shile All-Steel Storage Bin

stacking type has been brought out by the Palmer-Shile Co., 7146 W. Jefferson Ave., Detroit 17, Mich. The construction of the bin includes corner plates which allow for convenient bin stacking and storage. The four-way entrance design permits the bin to be picked up from any one of four sides.

Made of heavy steel plate with legs and corner reinforcements of angle iron.

SEND US YOUR PRINTS FOR *Quotations*

**THREAD GRINDING  
BROACHING  
MAGNETIC INSPECTION**



**TAYLOR  
MACHINE COMPANY**  
AVIATION & AUTOMOTIVE PARTS  
*Gear Specialists*  
1001 EAST 61ST ST. CLEVELAND 13, OHIO

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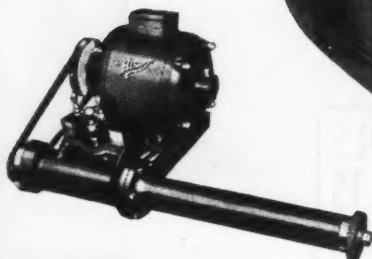
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ON

DR  
PANY  
E PARIS  
233  
40 S. 40

May, 1945

# GRINDERS — INTERNAL — EXTERNAL — SURFACE



3 H. P. Grinder with wheel head for external and surface grinding operations.

1 H. P. Grinder with 16 inch long encased spindle for internal grinding. Interchangeable open type spindle shown at left. Extensions of various diameters can be furnished for grinding holes up to 24 inches deep.

Hisey Wide Range Precision Grinders can be mounted on lathes, planers, boring mills, milling machines and other machine tools for all sorts of internal, external and surface grinding operations. Rigid construction throughout insures accuracy for production as well as tool room operations. Capacities range from  $\frac{1}{4}$  to 10 H. P. Spindle units have dovetail slide and internal and external spindles are quickly interchanged. V belt drive provides correct speed for all types and sizes of grinding wheels. Slide bases have large flat pad with bolt slots to facilitate mounting on the regular tool holding fixture of the machine.

Constant speed motors are used throughout providing uniform grinding speeds as is required for satisfactory grinding results.

Write for Catalog 70WM



Palmer-Shile Storage Bin may be handled with a hand or power lift truck or fork truck. It can be tiered with a portable elevator, high lift or fork truck.

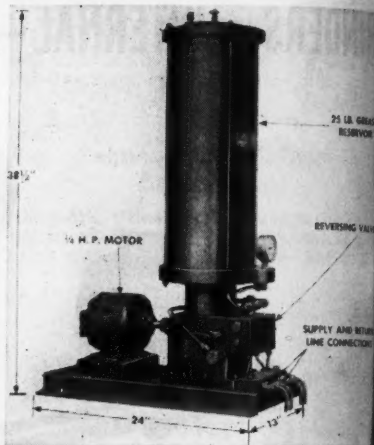
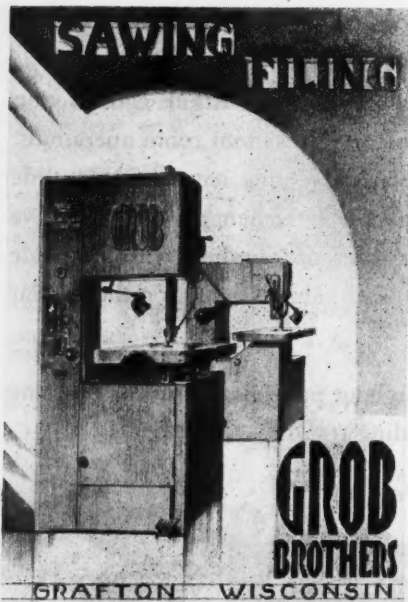
## Farval DC-25 Automatic Central Pumping Unit

Designated as the DC-25, an automatic central pumping unit of the double plunger, slide valve type which affords a positive high pressure means for handling all classes of lubricants without the use of

## GOOD MACHINE TOOLS INSURE PERFECT RESULTS AND TOP PRODUCTION

Specify "QUALITY" H. S. Woodruff  
Keyway Cutters When You Have a  
Tough Job To Lick

**QUALITY TOOL WORKS**  
WAUKESHA ILLINOIS



Farval DC-25 Automatic Central Pumping Unit

springs, check valves, or stuffing boxes is announced by The Farval Corp., 210 E. 80th St., Cleveland, Ohio. The unit is constructed for pumping either oil or grease, and is said to require no attention except the renewal of the lubricant supply in the reservoir.

The Farval DC-25 pumping unit delivers lubricant under pressure to all bearings in the system through two main supply lines serving a Farval Dauline measuring valve at each bearing. Frequency of operation is controlled by an electric time clock. A suitable signal device is available to indicate any interruption to the normal operation of the system.

For individual machine lubrication, the DC-25 can also be furnished with a rotary drive and with hydraulic timing, so that the unit will start and stop with the equipment served.



## DRILL THESE HOLES

BY A QUICK, EASY, INEXPENSIVE METHOD

Your business letterhead will bring literature.

**WATTS BROS. TOOL WORKS**  
Wilmerding, Pa.

Setting New Standards for..

FOR STANDARD AND  
SPECIAL TOOLS MADE  
TO YOUR BLUEPRINTS

- ✓ SPEED
- ✓ PRECISION
- ✓ FINISH
- ✓ LONG LIFE

TELEPHONE • LEXINGTON 5380

ARCHER & SMITH

LIMITED

CARBIDE Cutting Tools HI-SPEED

125 NORTH EASTERN AVENUE LEXINGTON 34, KENTUCKY

With every modern facility for precision production on small and big jobs—standard or special—Carbide or Hi-Speed—with the "know how" based of years of experience—with a reputation for service and attention to details, Archer & Smith invites your inquiry—and pledges action. Write for catalog. Send blueprints.



ARCHER & SMITH, LTD.,  
125 NORTH EASTERN AVE.  
LEXINGTON 34, KENTUCKY

Please send latest Cutting Tool catalog. ☐ Blueprints of special tools we require are enclosed; or ☐ mailed under separate cover.

Name.....Title.....

Firm Name.....

Address.....

City.....State.....



**Dual  
Super-Cut Zurium  
Bonded Diamond Wheel**

### Dual Super-Cut Zurium Bonded Diamond Wheel

Described as two grinding wheels in one, the Dual Super-Cut Zurium Bonded Diamond Wheel developed by Industrial Abrasives, Inc., 3724 W. 38th St., Chicago 32, Ill., can be used for the rough grinding and fine finishing of cutting tools.

The wheel includes two separate grinding surfaces. The outer (7-degree) beveled surface contains layers of coarse diamonds whereas the inner flat surface is built up of fine diamonds (400 mesh).

By merely angling the slide or point of a carbide tool, the tool, through the use of the Dual Super-Cut Zurium Bonded Diamond Wheel, can, it is claimed, be rough ground and superfinished in seconds without the operator having to shift his position.

### Clark Master Diamond Checking Set

A master diamond checking set for checking the accuracy of hardness testing equipment is now being marketed by Clark Instrument, Inc., Dept. MS, 1020 Ford Rd., Dearborn, Mich. Designed for use in connection with Clark hardness testers and other instruments used for Rockwell testing, the set consists of a gold-plated diamond penetrator and two test blocks. The penetrator is carefully made to extremely close tolerances to provide the highly accurate measurements required for checking readings.

## H. S. TAPER PIN REAMERS

### LIST PRICE EACH

Size	Straight Flute	Helical
7/0	3.50*	2.75
6/0	3.50*	2.50
5/0	3.25*	2.50
4/0	3.25*	2.50
3/0	3.25*	2.25
2/0	3.00	2.25
0	2.80	2.25
1	2.90	2.50
2	3.00	2.75
3	3.00	3.00
4	3.25	3.50
5	3.50	3.75
6	4.25	4.25
7	5.25	5.00
8	6.75	5.75
9	8.25	6.25
10	9.00	7.50



**\*Factory Stock**

**Straight Flute—List less 45%**

**Helical—List less 10%**

*Write for our Catalogue  
and Price List*

**CENTER TOOL CO.** *Machine Shop Equipment*  
151 CENTRE ST., N.Y. 13



# ALCO

## RELEASING TAP HOLDER HOLDS TAPS SECURELY

### *Without Bushings*



FOR HAND SCREW MACHINES  
AND TURRET LATHES

Make every minute count. Utilize your present manpower most efficiently for production of those war contracts and get set now for the post-war era when competition for civilian goods will be keen. As much as 50% of set-up time can be saved with ALCO Tools for the screw machine industry.

This Alco Releasing Tap Holder is built for accurate thread cutting exactly on centers. The patented construction of this tool holds the tap absolutely concentric with the work so that all leads of the tap carry the same load and cut the same size chip. This distribution of wear on the tap lengthens its life and prevents breakage usually caused by off-center tapping.

Another outstanding feature of this tool is its rugged construction for performing heavy duty work and very exacting threads.

WRITE FOR  
NEW CATALOG NO. 6

# ALCO EFFICIENT TOOLS

**THE ALCO TOOL CO. 152 BIRDSEYE ST.**

**BRIDGEPORT, CONN.**

**Detroit: 908 Stephenson Bldg., MADison 5870. Chicago: 6219 S. Kenwood Ave., Hyde Park 6807**

When checking, the master diamond penetrator replaces the regular penetrator in the machine.



Clark Master Diamond Checking Set

The two master test blocks are also held to extremely close limits and are intended for use only in connection with the master diamond. The blocks and penetrator are furnished ready for use in a fitted case.

## Fostoria Portable Infra-Red Unit

A portable infra-red unit which may be clamped or set up on or over benches, tables, conveyors, machines, and so on, has been placed on the market by The Fostoria Pressed Steel Corp., Fostoria, Ohio. The unit is available in three models designated as the 60-000, 60-200, and 60-100.

The 60-000 is strictly a hand model which can be converted to a self-supporting model by the addition of flexible arms and a base. The Model 60-200 includes a clamp base which permits it to be mounted on benches or framework, either singly or in multiple pairs. The flexible arms allow for positioning the unit at any angle desired. The Model 60-200 is 40 1/2 inches long from bench top to reflector edge and is designed for clamping on pipes of round or square stock up to 3 inches and/or benches up to 2 1/2 inches thick.

The 60-100 is a flexible model which can be moved quickly and easily. A crow-foot base with vertical upright and adjustable clamp permits the horizontal arm of the unit to be moved up or down to a maximum height of 24 inches and to be extended horizontally a maximum of 18 inches. The crow-foot base is provided

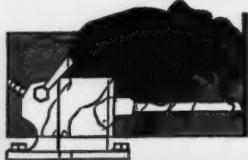
Presenting the Famous

## MEAD AIR CLAMP

Wherever a drill comes down, *something* must hold the work. Wherever a drilling-jig is required, *Air-Clamp* will simplify it.

Wherever speed is desired, *Air-Clamp* will produce it. *Air-Clamp* holds with relentless pressure; it is undisturbed by size variations (such as in casting), it scoffs at vibration (how many drills have been broken due to faulty hold-downs?), chatter, snagging. *Air-Clamp* holds work of any size or shape in any position, at any angle. Can pay for itself on a single fixture; saves its cost on a few days' drill-press output. Reduces operator fatigue.

Saves hours and dollars in drafting-room, jig department, tool room and production line. *Air-Clamp* fits any drill-press having a cylindrical column. Special fixtures for Tee-slotted tables, light milling work, etc. Hand and/or foot control. Shipped on approval to responsible concerns. Write for new *Air-Clamp* Catalog.



Prompt  
Shipment!

For  
Greater  
Drill Press  
Output

**MEAD SPECIALTIES COMPANY**

4114 North Knox Ave.

Dept. AA-545

Chicago 41, U.S.A.

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ay, 1945

*Again—*  
**APPROACHING THE SUBJECT  
of SIZE!**

They keep making 'em **BIGGER** with

# RED CUT SUPERIOR

• FOR URGENT MASS PRODUCTION

• WHERE ONLY THE FINEST  
TOOL STEEL MEASURES  
UP TO THE JOB!

the plant of a large  
western manufacturer, this  
plant tool-cutting section  
72" long, with a diameter  
of 6.526"—is one of a  
pair of rougher and finish-  
er broaches used for  
high production of aircraft  
propeller-hub completed  
involute splines, to ex-  
tremely close tolerances.  
Hubs are #4340 steel forg-  
ings—365 to 385 Brinell  
—a severe test of even  
Red Cut Superior, passed  
with colors flying!

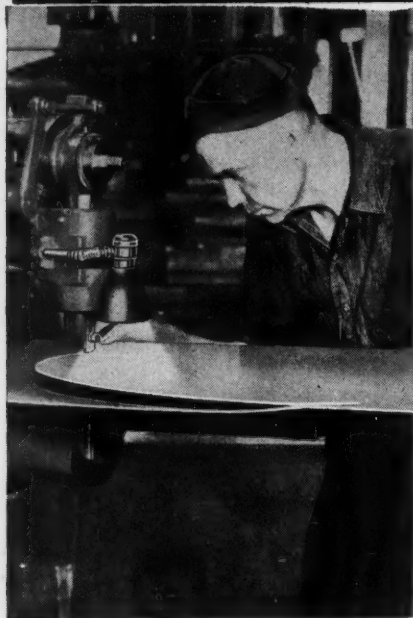
A well-known mid-west  
manufacturer employs this  
supersize precision tool in  
the exacting production of  
reduction driver gears for  
aircraft engines. The  
broach, of 76-spline in-  
volute form, is 67" long,  
with 6.333" pitch diam-  
eter, and outside diameter  
of 6.500". Red Cut Su-  
perior was chosen for cut-  
ting ability, ease of  
manufacture and heat  
treatment outstanding  
among fine tool steels.

## Vanadium-Alloys

**STEEL CO. LATROBE, PA.**

**COLONIAL STEEL DIVISION ★ ANCHOR DRAWN STEEL CO.**

# VIMCOLIGHT



## GREATER ACCURACY on CLOSE WORK!

Countless man-hours are saved . . . spoilage is reduced . . . and production is "upped" when glareless, on-the-spot VIMCOLIGHT is used on machine tools. It cancels out the shadow menace and minimizes eye fatigue.

VIMCOLIGHT is flexible . . . adjustable . . . easily attached anywhere. Inexpensive tool. Used as standard equipment by many leading machine tool manufacturers.

### VIMCO MANUFACTURING CO.

111 Chenango St.,

Buffalo 13, N. Y.

with rubber feet.

The Fostoria Portable Infra-Red Unit features a reflector that is gold plated on the inside. The outside of the unit is finished in gray wrinkle. Each model is supplied complete with 18 feet of cord with plug and switch, as well as 375 watt 110-volt G-30 lamp with medium skirted me-



Fostoria Model 60-100 Infra-Red Unit

chanical base. All models can be operated on either alternating or direct current.

### Bristol Model 93 Air-Operated Controller

Designated as the Model 93, an indicating air-operated control instrument for controlling temperature, pressure, vacuum, liquid level, and humidity has been developed by The Bristol Co., Waterbury 91, Conn. The controller operates on the Free-Vane principle of automatic control, and has a throttling range of from  $\frac{1}{4}$  to 15 per cent, with the adjusting mechanism arranged so that changes in the throttling range can be made by the user without the need for tools.

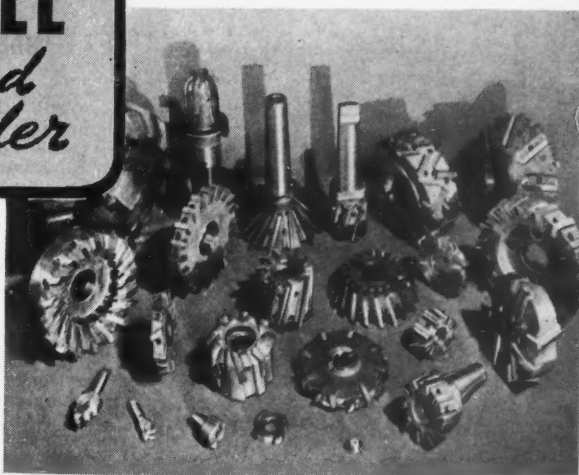
The Bristol Model 93 Controller can be set to control at any value within its range by turning the control pointer

# INGERSOLL

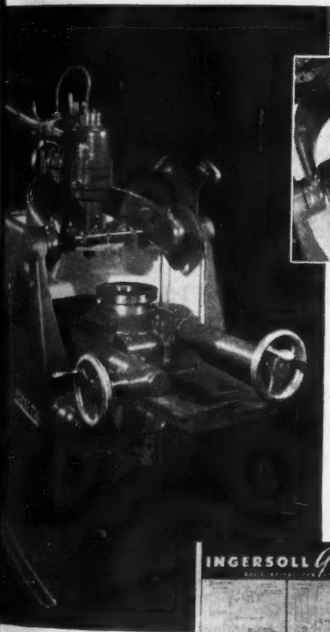
## Cutters and Cutter Grinder

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Ingersoll specializes in the design and manufacture of inserted blade milling and turning tools for use on all makes of milling and boring machines. A wide variety of standard types and designs of face mills, side mills, staggered tooth slotting, spiral slab and end mills cover most milling and boring applications. Modifications of these standard designs and special cutters are made to suit the unusual conditions. Cutters are furnished with high speed steel, cast alloy, or carbide tipped blades.



Write for cutter catalog describing complete line of standard inserted blade cutters.



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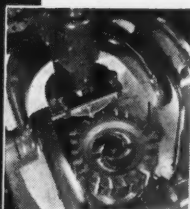
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May, 1943



CONVENTIONAL FACE MILL

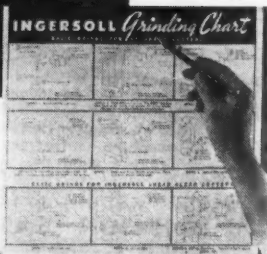


INGERSOLL SHEAR CLEAR



DOUBLE ANGULAR CUTTERS

To obtain best results with your milling cutters it is essential that they be properly ground. The Ingersoll cutter grinder is particularly designed for grinding face milling cutters at a single setting from 4" to 30" in diameter with maximum peripheral face of 7". It will also grind solid shank, radius, staggered tooth, and angular inserted blade cutters. It is fast, accurate, and may be operated by the average mechanic.

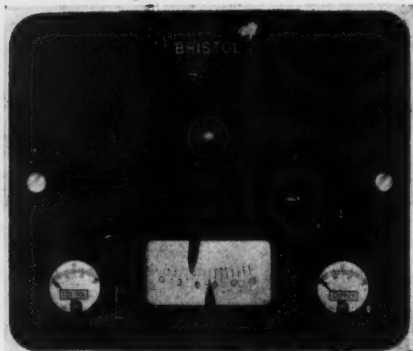


The unactive 15" x 23" grinding chart gives basic grinds for standard milling cutters. These charts are suitable for mounting in a conspicuous place in tool rooms and are available for free distribution on request.

Write for cutter grinder bulletin which illustrates the wide range of application of this grinder and assists the operator in the best methods of grinding.



INGERSOLL MILLING MACHINE CO., ROCKFORD, ILL., U.S.A.



Bristol Model 93 Air-Operated Controller

to the desired value. The instrument is built so that it can be changed by finger adjustment from reverse to direct action, or vice versa.

Typical applications for the Model 93 controller include the control of temperatures in bake ovens, drying ovens, retorts, plating tanks, and soft metal pots, and the control of steam pressure, pressure in retorts, and so on.

## Blickman Model No. 1889 Mobile Canteen

The illustration herewith shows one of eight basic models of mobile canteens now being manufactured by S. Blickman, Inc., Weehawken, N. J. Designated as the Model No. 1889, this unit includes shelves for sandwiches, pies, fruits, candies, cigarettes, and so on; a dry ice cooled ice cream drawer, two 4-gallon soup insets for service and two 3-gallon containers for reserve supply, an insulated electrically-heated 5-gallon coffee dispenser; a compartment for bottled cold drinks; paper cup dispensers; and storage space for miscellaneous supplies. Coffee and soup capacities can be varied to meet specific requirements. The approximate serving capacity of the unit is 200 persons.

The Model No. 1889 mobile canteen is constructed with a 3-inch ship-chassis, reinforced with angle iron. The superstructure, including the shelves and disappearing doors, is made of 18 gauge lacquer-finish steel. A batten bar is provided for locking doors in closed position. Doors have recessed finger grips.

The top of the body is constructed

## New **JOHNSON** No. 2014 Drawing Furnace

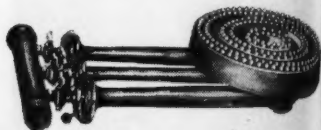
Provides easy control of 200° to 1150° F.  
to handle wide range of jobs.



- Equipped with POWERFUL, Flexible  
JOHNSON Concentric Ring Burners

3

Pot Sizes
Diam.—Depth
14 x 20
10 x 12
10 x 14



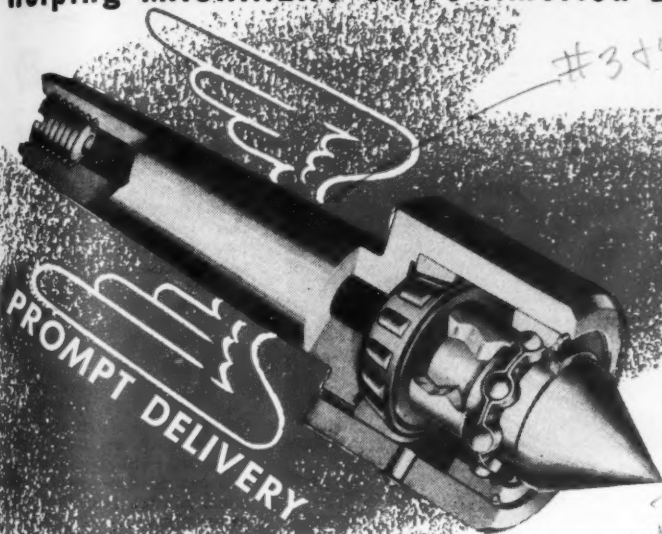
Designed for liquid baths and low temperature salts, this new Johnson Drawing Furnace can be used for a wide variety of operations in large or small plants. Independently controlled burners give wide turn-down range. Heavily lined with high temperature refractory and equipped with pressed steel pot.

Write for Descriptive Literature

**JOHNSON GAS APPLIANCE CO.**  
571 E. Avenue N. W., Cedar Rapids, Iowa



# Helping MACHINERY Serve America Better!



OVER 100 PRODUCTS TO HELP MACHINERY SERVE BETTER

## NEW IDEAL "Universal" CHUCK

- Fits easily on any lathe
- 3 Jaws hardened and ground, 2 sets—Internal and External Work
- Cast adapter with each chuck
- 3 Pinions for faster chucking
- LOW COST—High Precision



Other IDEAL Machine Tool Products Include: 4-Jaw "Independent" Chuck (6"), Demagnetizers, Metal Etchers, Grinding Wheel Dressers, Balancing Ways, Dust Collectors, Electric Cleaners.

Write for **FREE IDEAL**  
Machine Tool Catalog.

## IDEAL Live Center Speeds Production

America's machine tool users know from war-time experience how IDEAL Live Centers have helped speed production by making it possible to turn heavier loads, take deeper cuts, at higher speeds.

For post-war production, IDEAL Live Centers offer the same additional advantages of accurate turning (due to special bearing construction), elimination of dead-center-friction, and set-up economy.

4 Interchangeable Inserts for all kinds of centered and uncentered work.

## IDEAL Sycamore

IDEAL COMMUTATOR DRESSER COMPANY  
1031 Park Avenue • Sycamore, Illinois  
In Canada, Irving Smith, Ltd., Montreal, Quebec  
Sole U.S. Agent, Irving Smith, Ltd., Montreal, Quebec

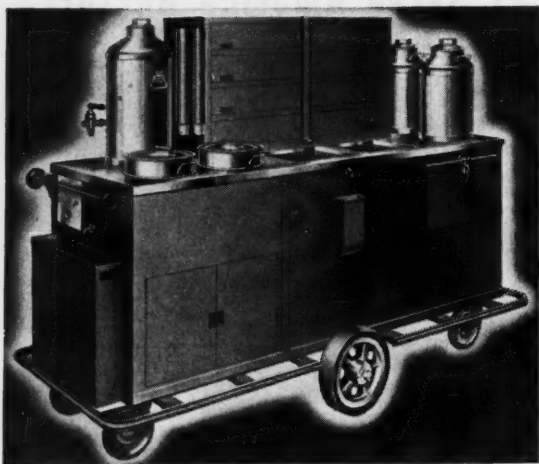
*write for gen cat*

MODERN MACHINE SHOP

293

May, 1945

May, 1945



**Blickman Model No. 1880  
Mobile Canteen**

the chassis form a bumper for the unit.

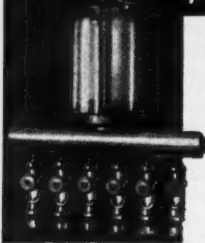
To provide for mobility, the unit is equipped with two cast iron 12-inch diameter rubber-tired wheels mounted on 1 1/4-inch diameter steel axle welded to the chassis, as well as four 6-inch ball bearing swivel casters. Finished in gray lacquer except where stainless steel finish is specified, the canteen is furnished complete with an 8-foot 3-conductor, rubber-covered electric cable with cap and connector body.

The Blickman Model No. 1880 Mobile Canteen is approximately 87 inches long x 38 inches wide x 65 inches high overall. The body is approximately 78 inches long x 30 inches wide x 36 inches high to work top.

of 14 gauge stainless steel, with insulated sliding covers of 18 gauge stainless steel for cold drink compartments. A convenient push handle is mounted on the body. Pieces of 1 1/4-inch O. D. iron pipe mounted on heavy wrought iron channel and electrically welded to

## MULTIPLE LUBRICATION

*Simplified*



Here you have only one receptacle to watch and keep filled—a time saver and an assurance of dependable lubrication. Gits "MD" Sight Gravity Feed Multiple Oilier is a simple, practical and economical means of lubricating from 3 to 12 individual points from a central reservoir. Large capacity, transparent unbreakable plastic reservoir provides clear vision of oil contents at all times. A shut-off valve is located at the top of the trans-

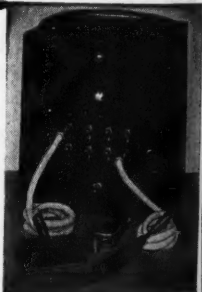
parent reservoir to prevent oil flow to the horizontal oil chamber when machines are not operating. Each drip fitting is equipped with an individual needle valve adjustment for regulating flow of oil, which can be locked against vibration. Ask for complete information on range of models and prices. Gits Catalog No. 60 illustrates and describes a full line of Oilers, Oil and Grease Seals and Lubricating Devices—write for your copy.

**GITS BROS. MFG. CO.**

1845 South Kilbourn Avenue, Chicago 23, Illinois

*Exclusive for over 35 years*

## MARK IRON, STEEL and CARBIDES



THE  
*Etchograph*  
WAY

**Original Electric Etcher. 3000 In Daily Use**  
Mark hardened parts, tools, dies, gages and fixtures of any ferrous metals including the hardest alloys and carbides—quickly—plainly. • Three sizes to meet all requirements. • Also a combined Etchograph and Demagnetizer.

• Write for circulars and prices.

**BREWSTER-SQUIRES CO.**

Hudson Terminal Bldg. New York 7, N. Y.

# Behind the eight ball with Production Problems



Because "eight balls" loom large in front of every production man at times . . . SYNCRO has developed a specialized service to remove such obstacles. SYNCRO specializes in tough engineering-production problems and in the manufacture of precision machined tool products for Victory and after Victory. Consult SYNCRO now—without obligation.

**SYNCRO DEVICES, INC.**  
**FERNDALE 20, MICHIGAN**

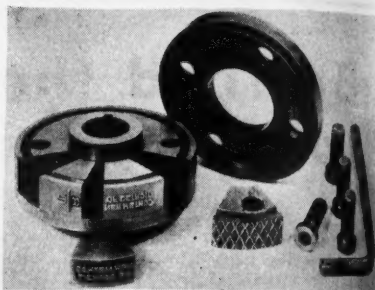
# SYNCRO

**Manufacturers of Precision Machined Products**

## Interchangeable Type Holder for New Method Roll Markers

An interchangeable type holder which is designed to permit various sizes of type to be held absolutely firm in automatic roll marking devices is announced by New Method Steel Stamps, Inc., 149 Jos. Campau St., Detroit 7, Michigan.

The holder is constructed to provide a wedge action in the assembly. This action is obtained through the provision of an angle groove in each marking die which mates with a beveled male ring on the insert retaining cover, as shown in



Interchangeable Type Holder for New Method Roll Markers

## GEARS GOOD GEARS ONLY

All Kinds—Any Quantity

AT THE RIGHT PRICE

THE CINCINNATI GEAR CO.  
Wooster Pike Cincinnati, Ohio

the accompanying illustration. The permanent locking action thus afforded is said to hold the stamp inserts so firmly in place that there is no possibility of their moving during operation. When small size type is used, the beveled groove helps to maintain strength.

## FILMS

### Technicolor Film on Arc Welding

A technicolor sound motion picture entitled "Magic Wand of Industry—Arc Welding," released by The Lincoln Electric Co., Cleveland, Ohio, portrays the dramatic progress of arc welding from its beginnings to its present vital wartime role. Also included are scenes which take the audience into the welding world of tomorrow.

Produced at the request of the U. S. Bureau of Mines, which is releasing the picture under the title "A Story of Arc Welding," this 25-minute presentation.

**THE GWILLIAM CO.**

**TYPE GB GROOVED RACES**

**BALL THRUST BEARINGS**

STANDARD SIZES OR SPECIAL DESIGN to your specifications; send sketch or worn sample, regardless of condition, for quotation, without obligation. • Our complete catalog will help you in making selection of bearings—shall we send it?

**THE GWILLIAM CO.**

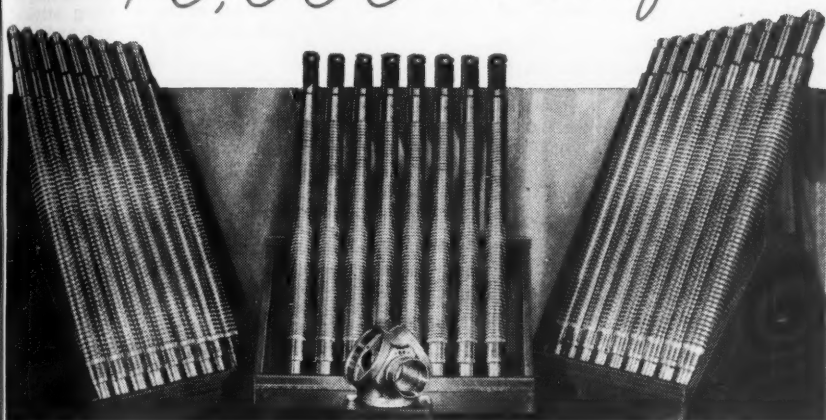
358 Furman St., Brooklyn 2, N. Y.

### TAMMS LAYOUT DOPE

Comes in Blue, Black, Orange, Red. Dries fast. Oil resistant! Won't chip, crack or flake off. Also ideal as marking dye. Get 8 oz. brush-in cans, pts., qts., drums. **SAMPLE FREE!**

**TAMMS SILICA COMPANY**  
228 N. LaSalle St. • Chicago 1, Ill.

*\$40,000 worth of..*



*..propeller hub spline broaches*  
**delivered in one shipment by U. S. BROACH**

**MEETING ALL THE EXACTING  
 SPECIFICATIONS OF THE  
 AIRCRAFT INDUSTRY**

U. S. Broaches have played an increasingly important part in many of the industries that had to meet the refinements of limits and finish required by government specifications.

This has been particularly true of the aircraft industry where precision is the watchword.

Broaching has not only proven ideal for aircraft manufacture, but it has been the

answer to many other industries' problems where precision manufacturing is required.

**For Example:** a large printing machinery company, who is now producing precision parts for aircraft gears and gun sights, has discovered that broaching provides greater accuracy, flexibility and convenience of operation. This has resulted in reduced labor hours per unit of output, low machine cost, simplicity of design, long tool life and economy. The last factor being of particular importance in the highly competitive markets when they again can manufacture printing presses.

*[ Perhaps you, too, may want to learn about ways to reduce your production costs—a letter sent today outlining your problems will receive prompt attention from our engineering department. ]*

**U.S. BROACH**  
*Company*



6465 E. SEVEN MILE ROAD

DETROIT 12, MICH.



TELEPHONE TWINBROOK 1-2213

MODERN MACHINE SHOP

297

New

The perforated is so firmly  
 ability of  
 When grooved

Welding

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May, 1945

May, 1945

filmed under the technical direction of Lincoln welding engineers, was staged and photographed in practically every major industry, including airplane factories, shipyards, refineries, steel mills, and Shasta Dam.

Primarily educational, the film graphically presents the fundamentals of arc welding, the electrical circuit, and the types of welded joints. The true action inside the arc is also revealed in actual photography and animation showing the penetrating "arc force" which assures high strength and good fusion of all metals.

The film is available in 16 and 35 mm. prints to business groups, technical societies, schools and colleges, and industrial plants at no charge except transportation. It may be obtained on request from The Lincoln Electric Co., 12818 Coit Rd., Cleveland 1, Ohio, or from the U. S. Bureau of Mines, Experimental Station, 4800 Forbes St., Pittsburgh, Pa.

### Magnesium Film

The Hills-McCanna Co., 3025 N. Western Ave., Chicago, Ill., announces the availability of a sound film depicting the

production and fabrication of magnesium, particular emphasis being placed on foundry operations. In addition to engineering and technical groups, the film is available to companies desiring private showings and also to colleges and universities.

### Abrasive Cut-Off Film

A. P. de Sanno & Son, Inc., Radiac Machine Sales Division, 106 S. 16th St., Philadelphia 2, Pa., now has available a 16 mm. sound film on the abrasive cut-off method. The film, which is entitled "Speed in Cutting," is narrated by Lowell Thomas and clearly shows the effectiveness of the abrasive disc method, the cutting off action and cutting off time of many metals, the features of various types of Radiac cut-off machines, and the de Sanno manufacturing facilities for supplying both cut-off machines and abrasive cut-off discs.

An especially interesting sequence depicts the action of a Radiac abrasive cut-off disc from which large segments have purposely been broken out. In spite of this unnatural condition, the disc, as visualized in the film, performs its cutting

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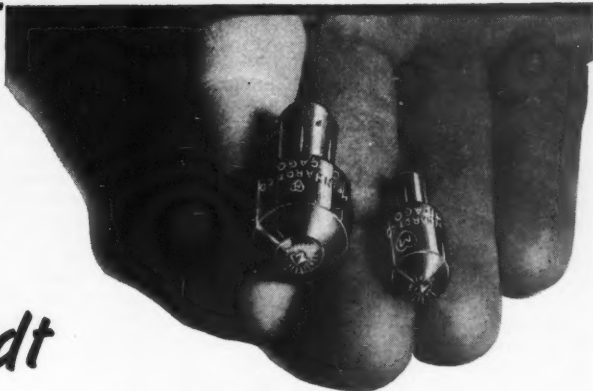
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task with little difference in action or speed. Other sequences show Radiac cut-off machines being used for cutting off many types of stock, including  $1\frac{1}{8}$ -inch roller bearing stock and 1-inch square unannealed stainless steel in the very fast time of  $2\frac{1}{2}$  seconds.

The film is available to engineering societies, training schools, educational institutions, and manufacturers engaged in performing cutting off operations, either production or miscellaneous.

## NEW BOOKS

**Dictionary of Engineering and Machine Shop Terms.** By A. H. Sandy. Published by Chemical Publishing Co., Inc., 26 Court St., Brooklyn 2, N. Y. 153 pages. Price, \$2.75.

Compiled in this volume are the definitions of many important terms used in machine shops, industries, and engineering literature as gathered by the author during many years of experience both in industry and as a lecturer. Its clear and simple language is said to make this dictionary useful not only for engineers and students of engineering,

but also for foremen and specialized workmen of the various shops and industries.

**"Plastics—Instructions for Machining"** is the title of a 40-page pocket-size booklet published by the Plastics Publishing Co., P. O. Box 968, Rochester, N. Y. The booklet contains helpful information on the sawing, punching, drilling, threading, tapping, milling, polishing and so on, of various plastics including Formica, Temite, Micareta, Marblette, Phenolite, Plexiglas, Catalin, Taylor Laminated Plastic, Lucite, and Plastacele. Copies of the booklet are available at a price of \$1.00 each.

**Personnel Relations.** By J. E. Walters. Published by The Ronald Press Co., 15 E. 26th St., New York, N. Y. 547 pages. Cloth binding, board covers. Price, \$4.50.

This book endeavors to set forth both principles and practice in the field of personnel relations as it is today. It includes in its scope the varying phases of personnel relations as they are determined and influenced by workers in

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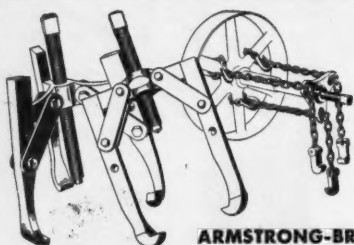


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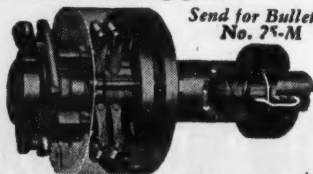
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labor unions, managements, the government, labor-management co-operation, individual employees, and personnel relations techniques and procedures.

The theme throughout the book is the consideration of these principles and practices in a setting of democracy, with an endeavor to afford a realistic understanding of what that implies and means for everyone concerned. Thus, the book attempts to present personnel relations not in a mere descriptive sense, but from positive democratic viewpoints of those who are actually concerned: from management's point of view when the management of personnel relations is being considered; from that of representatives of government when personnel relations under government co-operation and regulation are discussed; and from labor's standpoint when the aims, history, and actions of labor unions are reviewed.

For students in universities and colleges, as well as those in the field of industry and business, the author has endeavored to keep in view those elements of broad technical, professional, and liberal education which are becoming more widely recognized as the necessary background for work in the field of personnel relationships.

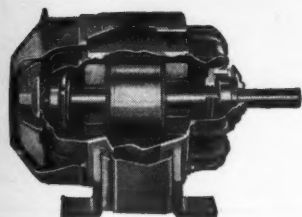
The material in the volume is based upon: personal inspection by the author of personnel relations in 152 industrial and business concerns; his consulting work in many companies; his experience as vice president in charge of personnel and labor relations of a large copper corporation, as well as director of personnel and professor of this subject at Purdue University; the results of questionnaires and written material from over 300 companies; personal conferences with many industrial executives, most of whom were and are in charge of personnel relations; personal criticism and suggestions from 50 prominent personnel relations managers and union officials who have read the original manuscript; and detailed constructive suggestions from many young personnel officers just starting in personnel work in companies.

**Direct-Current Circuits.** By Earle M. Morecock. Published by Harper & Brothers, 49 E. 33rd St., New York N. Y. 387 pages. Cloth binding, board covers. Price, \$3.25.

This textbook is one of a series prepared by the faculty of Rochester Athenaeum and Mechanics Institute as

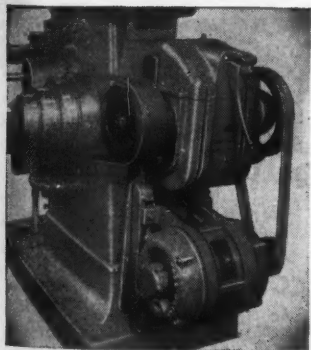
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part of its program for developing teaching materials which are functional and closely related to the requirements of industry. As the result of a continuous study made of the factors essential to success in various fields, electrical courses at the Institute are divided into two categories: (1) Application courses, the contents of which are validated in terms of specific occupational duties; and (2) basic or service courses, the contents of which are validated principally as prerequisites for the application courses.

The chief purpose in preparing this book has been to provide a text for the basic course in direct-current circuits in technical institutes, junior colleges, and industrial and extension schools. The book should also be of value to those having to depend on self-study to further their education.

In schools for which this text has been prepared, the course in direct-current circuits usually is scheduled before the student has obtained a mathematical background which includes calculus. For this reason, calculus has been avoided in this presentation. It has been assumed, however, that the student will possess the working knowledge of algebra and logarithms before

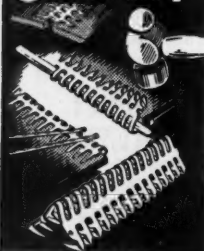
attempting to use this text. Examples with detailed solutions, followed by problems of a similar nature, are inserted at frequent intervals throughout the text. These problems enable the student to evaluate his ability to read and understand the material which has just preceded. Other problems, many of which are more difficult in degree, are placed at the ends of the chapters for review and further practice.

The laboratory instruction sheets inserted at the end of each chapter outline experimental work which is closely related to the subject contained in the chapter. The equipment and instruments required for the experimental work are to be found in most school laboratories.

**The Industrial Supervisor.** By John M. Amiss and Traver C. Sutton. Published by The Ronald Press Co., 15 E. 26th St., New York, N. Y. 243 pages. Cloth binding, board covers. Price, \$3.00.

This book is intended for all supervisors, both experienced and inexperienced, who desire to improve their judgment, skill, and understanding of their

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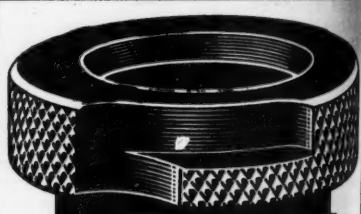
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The objectives of the book throughout are to provide material that will contribute toward the progress of the supervisor in a three-fold manner: (1) by furnishing accurate information upon which to base sound judgments; (2) by improvement to the maximum of his attitudes toward industry in general and his job of supervisor in particular through frank discussion of management problems; and (3) by developing skill on the part of the supervisor in carrying out his job.

Included in the book is a total of 17 chapters which are headed as follows: General Supervisory Responsibilities; General Qualifications of a Supervisor; Training in Industry; Leadership Characteristics; Cooperation; Discipline and Morale; Attendance and Punctuality; Job and Man Analysis; Industrial Safety; Fire Protection and Prevention; The Supervisor and Time Study; Labor Turnover; Planning; Equipment; Direct Labor Costs; Overhead Expense; and Ethics of Supervision.

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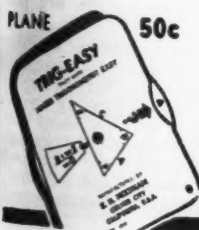
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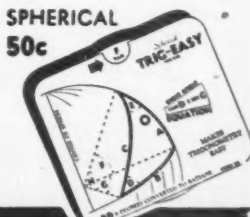
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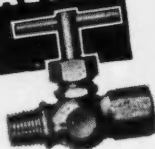
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**High-Frequency Induction Heating.** By Frank W. Curtis. Published by McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York 18, N. Y. 235 pages. Illustrated. Cloth binding, board covers. Price, \$2.75.

This book is intended to acquaint the manufacturing executive and technician with the fundamental principles of induction heating as applied to the hardening of metal parts, as well as to the joining of metal assemblies, such as brazing or soldering operations. It explains industrial applications of induction heating, describes in detail heating procedures and principles and constructional features of induction heating coils, and presents a broad outline of fixture design and process handling equipment.

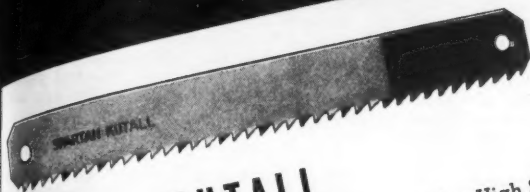
Designed to be of considerable aid in simplifying the application technique of induction heating, the book is also said to be a valuable reference work for setting up induction heating equipment for specific operations. It comprises a total of nine chapters which are headed as follows: Principles of Induction Heating; Types of Induction-Heating Equipment; Design of Induction-Heating Coils; Brazing, Soldering, and Joining; Hardening and Heat-Treating; Fixtures for Induction Heating; Miscellaneous Induction-Heating Applications; Designing for Induction Heating; and Dielectric Heating.

**Analysis of Drill-Jig Design.** By J. I. Karash. Published by McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York 18, N. Y. 333 pages. Cloth binding, board covers. Price, \$3.00.

This book provides an analytical, factual, systematic approach to the problems of tool design, employing drill jigs as a specific case study and outlining fundamental principles that apply in varied degree to all tool design problems. The process of design is analyzed into a clear cut procedure, stressing the essential decisions, their proper sequence, and basis of fact for arriving at decisions. Specific examples are presented.

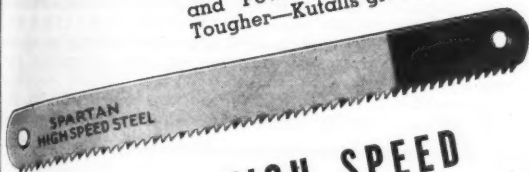
The book includes a total of 12 chapters which are headed as follows: Outline of Design Practice; Gathering Information; Analysis of Drilling Operations; Division-of-Work Decision; Machine Decision; Principles of Locating Secondary-Operations Jig Features; Positioning Features; Chip Control; Principles of Interchangeability; and Justification.

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**The Aeronautical Dictionary.** By Thomas A. Dickinson. Published by Thomas Y. Crowell Co., 432 Fourth Ave., New York, N. Y. 484 pages. Cloth binding, board covers. Illustrated. Price, \$3.50.

Compiled by expert aviation inspector and writer, this volume contains over 6,000 aeronautical terms which are completely and simply defined and alphabetically arranged. To impress indelibly upon the user's mind the exact meaning of the various terms, over 300 photographs and drawings (by James D. Powell) are provided throughout the text.

In addition, the book includes a full bibliography plus an appendix of useful charts, tables, and other helpful information. Laymen or experts should find this volume extremely useful.

**Metals and Alloys Dictionary.** By M. Merlub-Sobel. Published by Chemical Publishing Co., Inc., 26 Court St., Dept. RS, Brooklyn 2, N. Y. 238 pages. Cloth binding, board covers. Price, \$4.50.

Written by a research director and metallurgical engineer having an educational background and a practical knowledge of metals and alloys, this up-to-

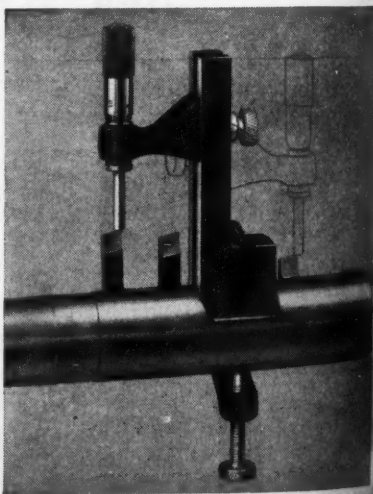
date reference work contains definitions of over 10,000 useful metallurgical terms, composition, properties, and uses of all the important commercial alloys. It covers the physical constants and properties of chemical elements, provides a description of machinery and processes used in modern metallurgy, and other pertinent information. All material is arranged in strict alphabetical order for easy reference.

"Metals and Alloys Dictionary" is especially designed for the use of individuals desiring information regarding the properties, applications and peculiarities of metals, alloys, and raw materials used in metallurgy.

**"How to Run a Lathe,"** 43rd Edition. Published by the South Bend Lathe Works, 386 E. Madison St., South Bend 22, Ind., this edition of the lathe operator's handbook includes a number of changes in text material and illustrations made since the previous edition was printed in 1942. The book contains up-to-date information on the operation and care of metal-working lathes, covering such subjects as the operation of the lathe units, grinding cutter bits, making

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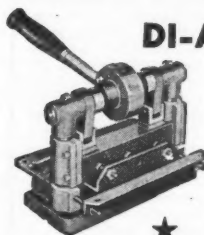
Here is an example of "DIE-LESS DUPLICATING" typical of a great variety of formed parts readily made with DI-ACRO Precision Machines, — Benders, Brakes, Shears. Picture below shows the DI-ACRO Bender making an acute right angle bend and photograph above shows the finished part formed to die precision. Women operating DI-ACRO units maintain a high out-put on production work.



DI-ACRO IS PRONOUNCED "DIE-ACK-RO"



## DI-ACRO Shear

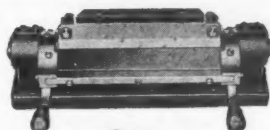


Squares and sizes material, cuts strips, makes slits or notches, trims duplicated stampings. 3 sizes. Shearing widths, 6", 9", 12".



## DI-ACRO Brake

Forms non-stock angles, channels or "Vees". Right or left hand operation. 3 sizes. Folding widths, 6", 12", 18".



## Send for Catalog

showing DI-ACRO Precision Machines and many examples of parts made with "DIE-LESS DUPLICATING".



**O'NEIL-IRWIN mfg. co.**

**406 EIGHTH AVE. SOUTH • MINNEAPOLIS 15, MINNESOTA**

May, 1945

MODERN MACHINE SHOP 311

accurate measurements, plain turning, chuck work, taper turning, boring, drilling, reaming, tapping, cutting screw threads, and so on.

Clearly and concisely written, the book contains 128 pages, 5½x8 inches, and over 365 illustrations. Postpaid copies of the book with paper covers are available for 25 cents or with leatherette covers for 75 cents in stamps.

**Acromark Steel Stamps.** A four-page three-color bulletin containing complete

data and prices as to Acromark Steel Stamps has been published by The Acromark Co., 9 Morrell St., Elizabeth, N. J. Copy of Bulletin No. 106 free upon request.

"Tips for Tube Mills on the Use of Carboly Mandrels" is the title of a 16-page booklet issued by the Carboly Co., 11143 E. 8 Mile St., Detroit 32, Mich. Numerous blueprint type sketches supplement the text. Copy of booklet free upon request.

**FULL PROTECTION — LIGHT WEIGHT  
LONG WEAR  
NU-LITE  
PLASTIC SLEEVES, GLOVES  
WORK APRONS**



Provide full protection to workers from troublesome dermatitis induced by industrial irritants. Only 1/7th the weight of conventional protection garments — makes for wearer's comfort and freedom of movement — reducing fatigue. NU-LITE sheds and resists water, oil, gasoline, strong acids, alkalis, degreasing and plating solutions. Let us show you how NU-LITE's low cost protection features can boost production in your shop. Samples furnished for approval.

**Safety Equipment, Production Aids  
and Packaging Specialties**

**NULITE PLASTICS**

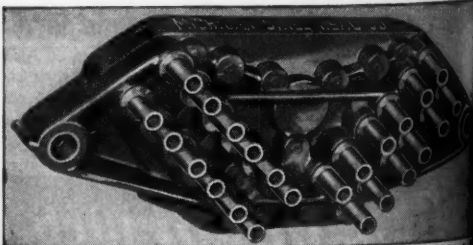
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VERONA, N. J.

**Pictured: a 24-Spindle Heavy-Duty Drill Head.**

**DESIGNERS AND  
MANUFACTURERS  
OF MULTIPLE DRILL-  
ING EQUIPMENT.**

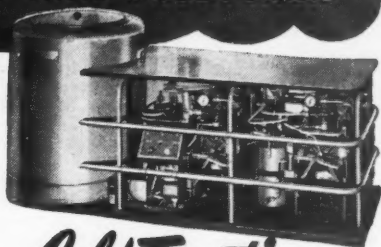
**We invite your inquiry.**



**MICHIGAN DRILL HEAD CO.**

**971 E. 8-Mile Road, Hazel Park, Mich.**

# HERE'S WHY SO MANY INDUSTRIAL MANUFACTURERS ARE USING COLD TREATING IN THEIR PRODUCTION



## Cold Treating

**Improves Quality . . . Conserves Production Time . . . and Reduces Operating Costs . . .**

### RESULTS OF

**Cold Treating**  
with  
**Deepfreeze Industrial Chilling Machines . . .**

#### SHRINKING OF METALS . . .

Steel life increased from 48 to 256 holes per drill.  
Turning center life increased 17 hours per spindle.  
Turn and life increased from 150 to 510 pieces per grid.  
Production increased from 3,000 to over 10,000 shell cases per punch.

#### STABILIZATION OF METALS . . .

Dimensional growth completely eliminated in gears and all component parts of machine tool.  
Aluminum forgings and castings stabilized against distortion after machining.  
Aluminum parts stabilized to work freely in low temperatures.

#### SHRINKING OF METALS . . .

Production doubled in shrink-fit assembly of stainless heading struts.  
Production increased 250% in the shrink-fit assembly of a bushing in Diesel pistons.  
Manufacturer saves \$3.675 per year shrinking steel valve inserts.

#### TREATING AND MISCELLANEOUS USES . . .

Aluminum instruments and parts pretreated for ultrasonics reaction save lives and time.  
Cold treating economically removes pitch from optical lenses.  
Deepfreeze machine used for storage of machined aluminum parts until forming operations are performed.  
Sub-zero temperatures are used for freezing rubber to permit easier machining.



**COLD TREATING** provides industry with a new production technique capable of effecting economies in a wide variety of operations. That's why it has found general acceptance by most of the country's leading manufacturers.

**COLD TREATING** is being used extensively by industrial organizations working with metals, to increase metal hardness and uniformity of structure—qualities that assure longer part life and better performance.

**COLD TREATING** is proving highly productive for shrink-fit assemblies by eliminating warping and scoring and saving time in such operations.

**COLD TREATING** is drastically reducing the time required to stabilize gauges, gauge blocks and other precision instruments. By following simple, standard procedures it is possible to completely stabilize various types of gauges in a few hours whereas formerly years were required.

**COLD TREATING** has scores of other uses for testing metals, instruments, lubricants, rubber and similar products for reaction under sub-zero temperatures.

The Deepfreeze -120° F Industrial Chilling Machine is designed to accommodate all of these industrial cold treating operations. Performance records furnish ample proof of the results obtained. A number of these are listed in the panel at the left. For complete data send for the 40-page Deepfreeze Cold Treating Booklet, described below.

### How can Cold Treating be Used in Your Production?

There's a way to find out. Send us a number of the tools or parts you're using. Submit information on the material and the heat treatment to which they have been subjected. We'll cold treat them, report the treatment to you, and return them for service and performance tests.

**FREE . . . HERE IS COMPLETE INFORMATION ON COLD TREATING . . .**

A 40-page treatise that includes everything from the history of Cold Treating to tested procedures. If you are acquainted with the subject, it will bring you up-to-date. If you're unacquainted, it will furnish you with the information you need to adapt cold treating to your production. Write today for your copy of Bulletin No. L-4.

**Besly Tap Manual.** Charles H. Besly and Co., 119 N. Clinton St., Chicago 6, Ill., has issued a reference manual for use in machine shops and other industrial plants where taps are used in production or maintenance work. The manual contains notes on the proper selection of taps for various types of work and provides complete tables covering tap fits, basic thread dimensions, and tap drill sizes. Recommended tapping speeds, lubricants, and angle of cutting face for various metals are also included. In addition, the manual contains sections on special taps, tap usage, and tap sharpening.

Each page of the manual is printed on tough heavy stock and varnished in order to assure long life and to protect it from grease and dirt. The manual has a metal binding which permits the pages to lie flat on a table.

Copy of the manual is available free to executives addressing requests on their company letterheads.

"New Approaches to Surface Protection" is the title of a 12-page pamphlet issued by Preferred Utilities Manufacturing Corporation. The pamphlet com-

prises primarily a technical discussion of the highly desirable advantages ascribed to the Preferred preparations White Hot and Pyro-Chrome.

These protective coatings are said to take advantage of properties of high reflectance—a principle whereby a substantial amount of radiant heat energy is put back to work instead of being absorbed by heat chamber linings. A series of interesting graphs shows the relative reflectance values of different colors found in refractories and other heat resisting surfaces. White and green are shown to have the highest heat reflectance properties.

Preferred White Hot, white in color and practical for temperatures up to 2,840 deg. F., and Preferred Pyro-Chrome, green in color and capable of withstanding heat up to 4,000 deg. F. are both applied like paint. A relatively thin coat, penetrating into the material to which it was applied, is intended to form a pore-deep bond, stabilizing the surface and making it highly resistant to heat, corrosion, and oxidation.

Copy of the pamphlet may be obtained by writing to Preferred Utilities Mfg. Corp., 1860 Broadway, New York 2, New York.

## BUILDERS' T' SURFACE GRINDER



### BUSY AS A BEE

Builders hand operated "T" Grinder keeps production humming... releases large automatic machines for long run jobs... grinds work 8" long, 4" wide and 10" high with exceptional accuracy and finish. Ideal for precision grinding jobs on dies, tools and small parts.

### BUILDERS IRON FOUNDRY

19 Codding St.  
Providence 1,  
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Prompt delivery.  
Send for Bulletin 644.



# HEAT TREAT SMALL PARTS

## *In Your Own Plant*

Save time and money when you have breakdowns or bottlenecks by heat treating small parts in your own plant with a Cooley Muffle-Type Electric Furnace. Used in hundreds of small and large plants, they serve in emergencies for heat treating breakdown repairs and in production for hardening, drawing and annealing tools, dies and troublesome small parts. Cooley Furnaces are ideal for industrial plants, tool and die shops and metallurgical laboratories.

### More Profitable Reasons for Using Cooley Furnaces

- 1—Hardening, drawing and tempering small batches in large furnaces is uneconomical.
- 2—Small parts can be normalized and annealed quickly and easily.
- 3—Convenient for pre-heating prior to high-speed hardening.
- 4—Always available to handle emergency repair work without delay.
- 5—Use as a pilot furnace to pre-determine techniques for production heat treating.

### AVAILABLE IN TWO SIZES

Type	Chamber Capacity	Amps 115 V	Watts	Amps 230 V	Price
MH-3	8"W 6"H 14"L	29.6	3400	14.8	\$124.00*
MH-4	10"W 6"H 18"L	.....	4800	20.9	\$191.00*

\*Includes Hearth Plate

**MAX. SAFE TEMPERATURE**—Continuous operation, 1750° F.; Intermittent operation, 1850° F.  
**AUTOMATIC CONTROL**—Indicating Controlling Pyrometer—Thermo-couple and lead wire complete—\$152.40.



### NO SALESMEN WILL CALL

Ask for free information and ordering instructions so you can make your own decision and determine your own requirements. Write for Bulletin No. 50 today—no obligation.

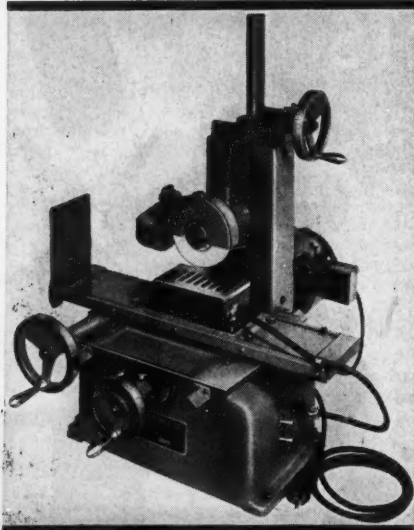


## COOLEY ELECTRIC MANUFACTURING CORP.

34 South Shelby Street

Indianapolis 7, Indiana

# SANFORD



**HIGH SPEED  
BENCH  
SURFACE GRINDER**

**ACCURACY WITHIN .0001**

A sensitive, highly accurate,  
machine specially designed

*"For The Job That  
Fits in Your Palm"*

**Write for Bulletin**

**Available on M.R.O. Certifications**

**SANFORD MFG. CO.**

**1279-81 SPRINGFIELD AVE.  
IRVINGTON 11, NEW JERSEY**

**American Hi-Torque Motor Pulleys.** The American Pulley Co., Dept. 534, 420 Wissahickon Ave., Philadelphia 29, Pa., now has available an eight-page illustrated catalog concerning Hi-Torque motor pulleys. Included are dimensions and list prices of standard sizes of pulleys and complete price information for made-to-order pulleys. Copy of Catalog HE-44 free upon request.

**Detroit Tap Reconditioner.** The improved Detroit Tap Reconditioner in which all operations necessary for keeping taps in best possible cutting condition can be quickly and accurately performed is described in a four-page bulletin now available from the Detroit Tap & Tool Co., 8432 Butler Ave., Detroit 11, Mich. Complete specifications together with various views of the machine and lists of standard and special accessories, are also included in the bulletin, copy of which is available by requesting Bulletin No. DTR-3.

**Farval Centralized Systems of Lubrications.** How centralized lubrication systems increase the production output of machinery and at the same time provide for savings in time, power, and lubricating materials, is explained in Bulletin No. 25 published by The Farval Corp., 3295 E. 80th St., Cleveland, Ohio. This 16-page bulletin, which is printed in three colors, is a graphic portrayal of the theory and practice of mechanical lubrication. It opens with a study of the machinery lubrication problem and of the economies that are inherent in a system which delivers lubricant to all bearings in exact measured amounts regardless of location. This information is faced by a large close-up of a Farval Manual Dosing System at work.

Following this is an explanation of how the Farval measuring valve operates to deliver a measured amount of lubricant. The construction and operation of both manual and automatic pumping units are similarly treated. The center spread is devoted to the economies of positive mechanical lubrication; and in the concluding pages a series of 24 application photographs suggests methods of locating and mounting pumping units and feed lines on many different kinds of machinery. Copy of Bulletin No. 25 free.

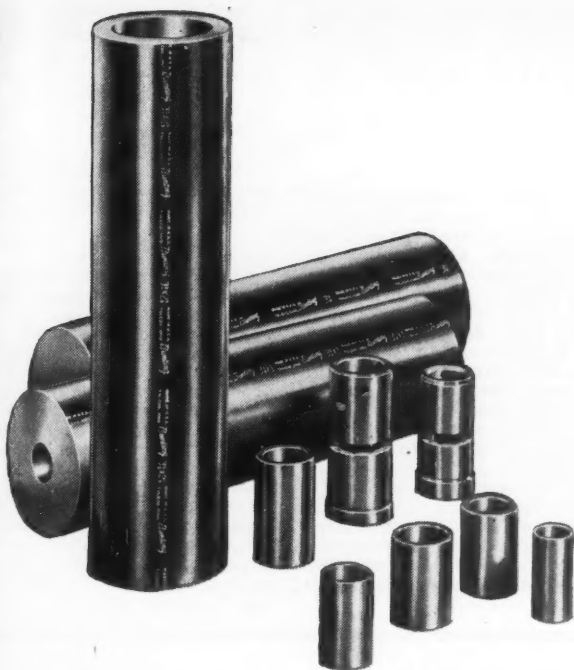


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# Bunting

BRONZE BEARINGS ★ BUSHINGS ★ PRECISION BRONZE BARS

**Lyon-Raymond Hydraulic High-Lift Truck** of 1,000-pound capacity is illustrated and described in a four-page bulletin issued by the Lyon-Raymond Corp., 1704 Madison St., Greene, N. Y. Various uses of this truck are treated. Copy of Bulletin 136 free upon request.

**Staples Precision Carboly-Tipped Tools.** Designated as the No. 44, a 52-page plastic-bound catalog presenting illustrated, descriptive, and tabular information, including prices and specifications, concerning a complete line of precision Carboly-tipped circular cutting tools has been prepared by the Staples Tool & Engineering Co., 2851 Massachusetts Ave., Cincinnati 25, Ohio. Treated are expansion reamers, solid reamers, core drills, shell reamers, spot-facers and counterbores, shell end mills, straight and spiral flute end mills, and other tools.

In addition, the catalog includes a technical section comprising information on reamer usage and recommended practice for reconditioning reamers. Copy of Catalog No. 44 is available to executives addressing requests on their company letterheads.

**"What the Hilliard Hilco Line Is Doing for Others and Will Do for You"** is the title of an eight-page colorful bulletin prepared by The Hilliard Corp., 117 W. 4th St., Elmira, N. Y., illustrating and describing the application of Hilco Hyflow Oil Filters, Oil Reclaimers, and Air Line Oil Purifiers to Diesel engines, trucks, gasoline engines, airplane engines, locomotives, and so on. Copy of Bulletin No. 96 free.

**Knu-Vise Toggle-Action Clamping Tools.** A 58-page plastic bound catalog concerning toggle-action clamping devices has been released by Knu-Vise Inc., 2201 Eighth St., Detroit 16, Mich. The catalog includes photographic reproductions of the full line of Knu-Vise products, including clamps of four types, C-clamps, pliers, and wrenches, together with mechanical drawings showing dimensions of the various tools and descriptions. A page is devoted to information relative to recommended pressures of the various models. A price list is included in the last few pages of the catalog, copy of which is available free to executives requesting Catalog No. 44.



*"Get me  
a  
Gas Mask"*

Spoiled coolant means needless waste of precious materials, loss of vital man-hours. Dolge Steridol service can reduce your operating costs and give your operators clean, decent material to work with.

Let a Dolge service man make a competent examination of your coolant to determine whether sanitation is indicated. A sample is all he requires for laboratory analyses. Then a complete, confidential report will be submitted promptly without charge. Write for booklet D-14 on "Cutting Oil Sanitation".

**THE C. B. DOLGE CO., WESTPORT, CONNECTICUT**

**STERIDOL** *Cutting oil germicides*



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# Keep Diamond Temperature

## *Below the Danger Line*



### with **JKS STA-KOOL HOLDERS**

Dressing a wheel at a mile-a-minute speed generates a terrific heat in the diamond tip of a dressing tool. Whether or not the stone becomes red hot, heat can play havoc with a diamond — cause checking and reduce strength even after proper resetting.

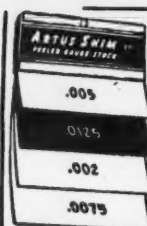
In a single point diamond tool . . . where four-fifths of the stone is generally set below the surface collecting heat and transmitting it to the holder . . . the J. K. Smit & Sons patented STA-KOOL holder removes all possibility of damage from overheating. Its internal ducts and fins allow quantities of coolant to pass around, through and under the metal setting. Setting and enclosed portion of the diamond are efficiently cooled. Excess heat created in the diamond point has no chance to accumulate inside the tool, but instead is dissipated in the larger cooled portion of the stone and setting. With proper use of the correct size STA-KOOL tool for the job, temperatures never rise above the Danger Line. Specify STA-KOOL holders . . . available for all makes of machines.

**J. K. SMIT & SONS, Inc.**  
157 Chambers St., New York 7, N. Y. 6400 Tireman Ave. Detroit 4, Mich.

DIAMOND WHEELS • TOOLS FOR DRESSING WHEELS • CORE BITS • METAL WORKING TOOLS • POWDER

May, 1945

MODERN MACHINE SHOP 319



### ARTUS PLASTIC SHIM & FEELER GAUGE STOCK

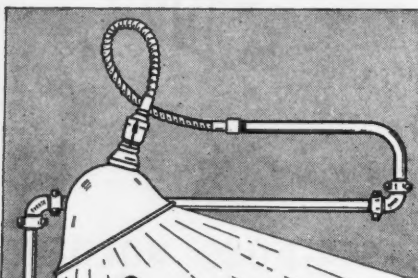
The COLOR tells  
the THICKNESS

Long lasting plastic, replaces scarce metal. Each thickness a distinctive, easy to identify color. Impervious to oil. 5"x20" sheets. Special sizes to order. Handy assortment, shim stock, 12 colors—12 thicknesses (.001-.030). Bound together. \$3.75.

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**INDUSTRIAL PRODUCTS SUPPLIERS**

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## Axxess Lights

Axxess Lights empower the worker to have the precise light his varied work demands. Their ready means to control the direction, power and character of their light are vital essentials for near seeing. Few interchangeable parts make the fixtures for small or large machine tools.

Write for information.

**SAMPSON AXCESS SYSTEM, INC.**

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## famco FOOT POWERED SHEAR CUTS COSTS

Famco Squaring Shears cut up to 18 gauge mild steel with ease. Made in five cutting widths (22" to 52"). Ruggedly built for long, hard service. All models have front, side and back gauges. Write for catalog.

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- ✓ **SMALL INVESTMENT**  
First Cost is Only Cost
- ✓ **NO OPERATING EXPENSE**  
Except for Labor
- ✓ **SIMPLE TO INSTALL**  
Unpack and Start Shearing
- ✓ **EASY GAUGE SETTING**  
Simple, Fast and Sure
- ✓ **ACCURATE SHEARING**  
Cross Head Reinforced
- ✓ **EFFORTLESS OPERATION**  
With Balanced Leverage

"Sew with Steel" is the title of a 16-page booklet issued by The Hobart Brothers Co., Box DM-651, Troy, Ohio, describing and illustrating in an interesting manner the application of arc welding to the fabrication of assemblies in sheet metal shops, construction work, ship building, aircraft work, factory maintenance, truck and body manufacture, railroad shops, and so on. Copy free upon request.

**Howe Truck and Trailer Catalog.** A 56-page catalog which fully illustrates and describes the complete line of warehouse trucks, trailers, dollies, platform skids, lift jacks, wheels, axles, and casters offered by The Howe Scale Co., Rutland, Vt., has been issued by this firm. Printed in two colors, the catalog lists complete specifications for each product, illustrates many special as well as standard items, and is indexed alphabetically by content and by code number for ready reference. Copy of Catalog P-15 free to executives.

"Evaluating the Forgeability of Steels" is the title of an 8 1/2 x 11-inch 78-page book published by the Steel Tube Division, The Timken Roller Bearing Co., Canton 6, Ohio. The book contains recommended forging temperatures for 68 steels as determined by the ball twist test conducted in Timken laboratories under the supervision of C. L. Clark, research metallurgical engineer. The apparatus and procedure used are described, and the results of tests on various steels interpreted.

Copy of the book will be sent free of charge to executives addressing requests on their company letterheads.

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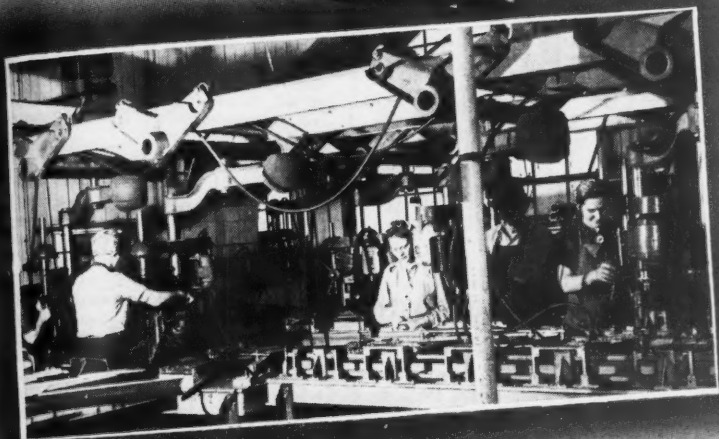
INSTALL  
Start Showing

BETTING  
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CARING  
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ERATING  
Leverage

May, 1945



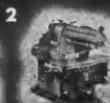
HIGH on the list of war production achievements is the ingenuity of American engineers in adapting compact precision machine tools to solve tough manufacturing problems. This huge jig at Boeing's Chehalis, Wash. Branch is a good example. Production of B-29 "inboard wing compression ribs" was speeded up by swinging and swiveling Atlas drill press units into position for boring rivet holes through the complete assembly members. Air-operated locating clamps and drilling plates insured extreme accuracy. Can you adapt Atlas tools for peacetime jobs in your plant? Send for latest specification catalogs.

ATLAS TOOL COMPANY, 346 N. Picher, Bk. Kalamazoo 13D, Mich.

**4** *Atlas*  
**TOOL TEAM**  
FOR  
**SMALL-PARTS MACHINING**



LATHES



MILLING MACHINES

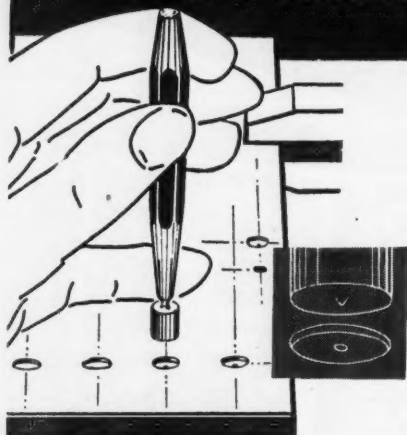


SHAPERS



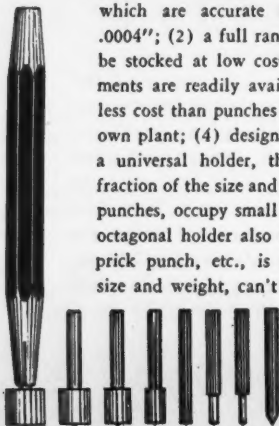
DRILL PRESSES

# Allen Template Transfer Punches



## Locate and Center INSTANTLY

These punches incorporate a number of definite advantages, i.e., (1) The points are concentric with the bodies which are accurate to size within .0004"; (2) a full range of sizes may be stocked at low cost; (3) replacements are readily available, at much less cost than punches made in user's own plant; (4) designed for use with a universal holder, they are only a fraction of the size and weight of solid punches, occupy small space; (5) the octagonal holder also takes a scriber, prick punch, etc., is of comfortable size and weight, can't roll.



**H. D. ALLEN**  
MANUFACTURER  
3201 CASITAS AVENUE  
LOS ANGELES 26 • CALIFORNIA

"The Miller That Uses Its Head" is the title of a 12-page picture catalog issued by W. H. Nichols & Sons, Waltham, Mass., illustrating the design of the Nichols Miller and its use in performing boring, plating, facing, grinding, contour, profile straddle, heavy hand, and vertical milling operations. Copy free upon request.

"Correct Drill Pointing" is the title of a 12-page illustrated booklet now available from the Chicago-Latrobe Twist Drill Works, 411 W. Ontario St. Chicago 10, Ill. The booklet includes information regarding the correct procedure for pointing twist drills for use on all types of materials and is offered free to interested individuals upon request.

**Ekstrom Carlson Cutters.** Illustrative, descriptive, and tabular information of the complete line of high-productivity cutters offered by Ekstrom, Carlson Co., Rockford, Ill., is contained in a 4-page catalog prepared by this firm. Treated are router bits, rounding-over cutters, cove cutters, moulding cutters, dovetail cutters, hand hole cutters, knife blanks, form cutters, shape knives, and so on.

The catalog also contains illustrations and descriptions of routing machines, radial drills, vertical mills, grooving machines, shapers, sanding machines, and other units. Copy of Catalog No. 100 free to executives upon request.

**"Underwater Cutting and Welding"** Due to the widespread interest in this article on "Underwater Cutting and Welding," written by H. L. Ingram, of the Applied Engineering Department of Air Reduction Sales Company, this article has been reprinted in booklet form.

Beginning with a brief history of the process, the booklet describes the techniques employed for both torch and carbon arc cutting and metallic arc welding underwater, and lists pressure tables for torch cutting at various depths and tip sizes for cutting materials from 1/4 to 2 inches thick.

Copy of the booklet may be obtained from Air Reduction, 60 E. 42nd St. New York 17, New York.



## REMARKABLE SAVINGS in:

- Machine Hours
- Man Hours
- Time and Money

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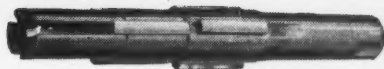
## NICHOLSON Expanding MANDRELS



### TYPE B—STRAIGHT JAW DESIGN

Adapted for work with both short and long bores . . . both types sold singly or in sets. Prompt delivery. Bulletin 1043.

**W. H. NICHOLSON & CO.**  
136 OREGON ST., WILKES-BARRE, PA.



### TYPE A—STEP JAW DESIGN

Especially adapted for holding work with short bores while being machined between centers on lathes, grinders, millers, shapers, etc.

Size No.	Range of Bores Taken	Length Overall
1A	$\frac{1}{4}$ " to 1"	9"
2A	1" to $1\frac{1}{4}$ "	11"
3A	$1\frac{1}{2}$ " to 2"	12 $\frac{1}{4}$ "
4A	2" to 3"	20 $\frac{1}{2}$ "
5A	3" to 4"	21"

Size No.	Range of Bores Taken	Length Overall
1X	$\frac{1}{4}$ " to $\frac{1}{8}$ "	5"
2X	$\frac{1}{8}$ " to $21/32$ "	6"
3X	$21/32$ " to $\frac{3}{4}$ "	6"
00	$\frac{3}{4}$ " to $\frac{7}{8}$ "	8 $\frac{1}{4}$ "
0	$\frac{7}{8}$ " to 1"	8 $\frac{1}{4}$ "
1	1" to $1\frac{1}{4}$ "	9"
2	$1\frac{1}{4}$ " to $1\frac{1}{2}$ "	11 $\frac{1}{4}$ "
3	$1\frac{1}{2}$ " to 2"	13 $\frac{3}{4}$ "
4	2" to $2\frac{1}{2}$ "	17 $\frac{1}{4}$ "

Other Sizes Taking Up to 7" Bores

## THE "FORM - MASTER"

### ANGLE and RADIUS DRESSER

A sturdy, quality instrument designed by form-grinding specialists to dress both angles and radius at low cost. Two  $\frac{1}{3}$  ct. diamonds and instrument case included—\$150.00 complete.

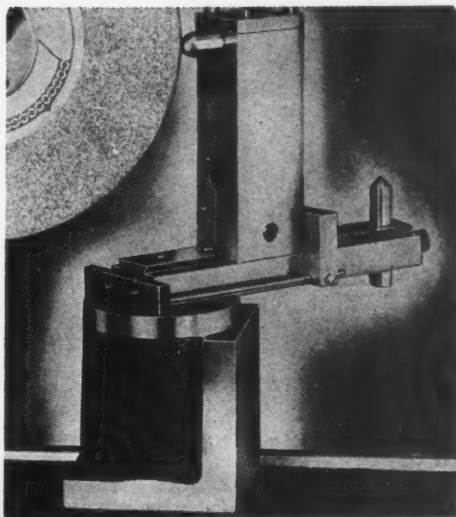
### Features

- Large range
- Chatterless and dustproof
- .0001" accuracy obtainable
- Simple to operate
- Reasonably priced

Call your supplier or write

**J. & S. TOOL CO.**

477 Main St., E. Orange 5, N. J.



**Sundstrand Oil Power Fluid Motors** for conveying oil under pressure to rotary motion are the subject of an eight-page illustrated, descriptive, and engineering data bulletin issued by the Sundstrand Machine Tool Co., Rockford, Ill. Copy free upon request.

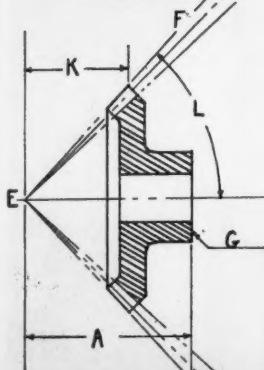
**Grobet Rotary Files War Supplement.** A six-page  $8\frac{1}{2}$  x 11-inch folder illustrating, describing, and pricing more than 72 rotary files of various shapes—both hand cut and ground from the solid—has been published by the Grobet File Company of America, 421 Canal St., New York 13, N. Y. A four-page insert included with the folder contains profile drawings of the different styles of rotary files.

The Grobet Supplement (to the regular company rotary file catalog) illustrates the files which are permitted to be manufactured as regular items as per W. P. B. Limitation Order L-216, Schedule IV, June 3, 1943, amended January 4, 1944. The supplement lists the different sizes in which each style may be obtained, giving the diameter and length of cut of each. Copy of supplement free upon request.

**American Flat-Belt Drive Equipment Catalog FBD-44.** Issued by The American Pulley Co., Dept. 434, 4200 Wissahickon Ave., Philadelphia 29, Pa., this 24-page catalog provides complete information on American steel split pulleys and bushings, shaft collars, shaft hangers and bearings, split and solid conveyor pulleys, Hi-Torque motor pulleys, belting, and Econ-o-matic drives. The application, design, and advantages of group drives are also discussed in the catalog, copy of which is available free upon request.

**Wodack "Do-All Electric Hammer and Drill.** An eight-page bulletin illustrating and describing a combination electric hammer and drill for use on concrete, stone, metal, and other materials, together with various available accessories for this tool, is now being distributed by the Wodack Electric Tool Corp., 4627 W. Huron St., Chicago 44, Ill. The bulletin also includes prices of the tool with different assortments of accessories, and a table of star drill sizes and prices. Also listed are chisels and other hammer tools. Copy of Bulletin 442 free upon request.

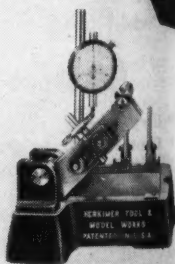
*Here's the Problem*



*... and here's the Answer*  
**EASY BEVEL GEAR GAUGING**  
**No Long Calculations**  
**No Involved Set-up**

With Herkimer sine bars and bevel-gear gauges, anyone with ordinary gauging experience and ability to read blueprints can quickly and accurately check all important bevel gear dimensions and relations. Production gauging made easy.

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## STANDARD D - 4 Abrasive Band Grinder

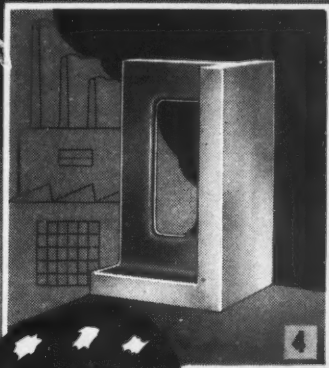
This new, streamlined bench type grinder assures fast, quality finishing on metals, plastics, wood, fibre... at low cost. Built to machine tool specifications, Standard D-4 is equipped with improved band tension control and specially designed protective motor hood. 4x36 1/4" band. The ideal portable unit.

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MANUAL ON FINISHING—WRITE TODAY

**WALLS SALES CORP.**  
96 Warren St., New York, N. Y.

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SURFACE PLATE EQUIPMENT



*Masterpieces  
OF*

## PRECISION UNIVERSAL IRONS

FOR providing square reference lines  
or acting as height blocks in measur-  
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### Other Surface Plate Equipment

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| ★ Box Parallels—<br>18 sizes   | ★ Angle Plates—<br>22 sizes |
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War Bonds!

**THE CHALLENGE MACHINERY CO.**  
GRAND HAVEN MICHIGAN

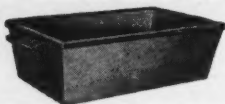
N. Y.

May, 1945

May, 1945

MODERN MACHINE SHOP 325

### New Nesting Type Tote Pans



20" long x 12" wide x 6 1/2" deep.  
16 ga., drag holes and handles both ends.

**J. L. LUCAS & SON, INC.**  
Bridgeport, Conn.

## HAMILTON SWISS TYPE GEAR HOBBERS



...for accuracy  
and speed in  
hobbing  
PINIONS,  
GEARS and  
SECTORS.

#### TWO MODELS

No. 00 SPUR GEAR  
HOBBER for work  
up to 2" dia.

No. 1 SPUR and  
SPIRAL GEAR HOB-  
BER (illustrated)  
for work up to 6"  
dia.

Write for further  
details to

**TRIPLEX MACHINE  
TOOL CORP.**

Manufactured by  
**THE HAMILTON TOOL CO.**  
Hamilton, Ohio

Sales Agents  
125 Barclay St.,  
New York 7, N. Y.

"How to Drill Square, Hexagon, Octagon, Pentagon, and Triangular Holes" is the title of a 28-page catalog published by Watts Bros. Tool Works, 700 Airbrake Ave., Wilmerding, Pa. Designated as the No. 15, the catalog illustrates and describes Watts patented full floating chucks and drills for drilling triangular, square, pentagon, hexagon, and octagon holes in steel, iron, brass, aluminum, micarta, bakelite, and so on. Copy free to executives upon request.

"Electronic Induction Heat Treating" is the subject of a six-page illustrated folder published by the Central Boiler and Manufacturing Co., 5818 Rivard St., Detroit 11, Mich. The folder cites the advantage of induction heat treating and points out that the company's electronic induction heat treating department is available to industry as a job shop service.

Attractively printed in color on heavy enamel stock, the folder is available to interested individuals free upon request.

**Metal Degreasing with Chlorinated Solvents.** A 10-page booklet of standard practices for degreasing metals or other non-porous materials with chlorinated solvents has been prepared by the Solvents Division of the Electrochemicals Department of E. I. du Pont de Nemours & Co., Wilmington 98, Del. A number of typical degreasing machines are illustrated in the booklet which outlines the fundamentals of machine design, installation, and operation that must be considered to ensure safety and efficiency. A list of literature references is also included in the booklet, copy of which is available free upon request.



### PEERLESS Abrasive Belt Surfacers

For speed and quality in grinding flat surfaces of metal, wood, hard rubber, celluloid and plastics. Furnished in 9", 14", and 20" sizes.

Other Horizontal and Vertical types for flat or round work can be furnished.

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GREENFIELD MASS.

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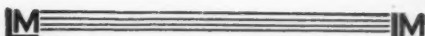
## DONLY PRECISION DOWEL PINS

STANDARD AND  
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Hardness and Precision  
ground to a tolerance of  $\pm$   
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## LEACH External Grinder

PRICE  
**\$875.00**  
Fully Equipped

Grinds Work  
from  $\frac{3}{4}$ " to  
11" in length  
and from  $\frac{1}{8}$ "  
to 7" in diameter.  
Our dealers will  
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Agents in all Principal Cities Throughout the World

## Robertson's ECONOMY Power Hack Saws

### FEATURES

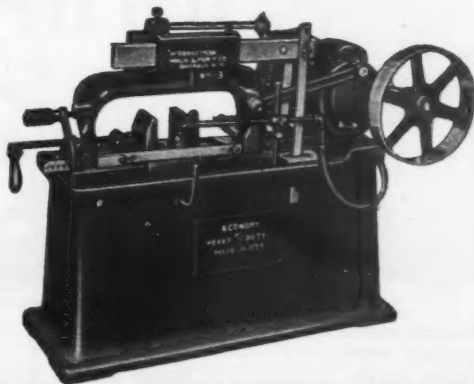
Rugged Simplicity Long Life  
Hairline Accuracy High Speed  
Long Blade Life Large Bearings

Few Adjustments  
Hydraulic Lift on Back Stroke

The machine illustrated is the  
ROBERTSON ECONOMY No. 3-B.  
Capacity: 6" x 6" with 6" stroke.  
Takes 10", 12", 14" blades.

There is a ROBERTSON ECON-  
OMY for every cutting job.

Write for information  
and delivery dates.



**W. ROBERTSON**

**MACHINE & FOUNDRY CO., INC.**

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BUFFALO 7, N. Y.

**Barnes Hydraulic Cylinders.** Bulletin 401-C descriptive of the line of hydraulic cylinders manufactured by the John S. Barnes Corp., 301 S. Water St., Rockford, Ill., has been released by this firm. Copy free upon request.

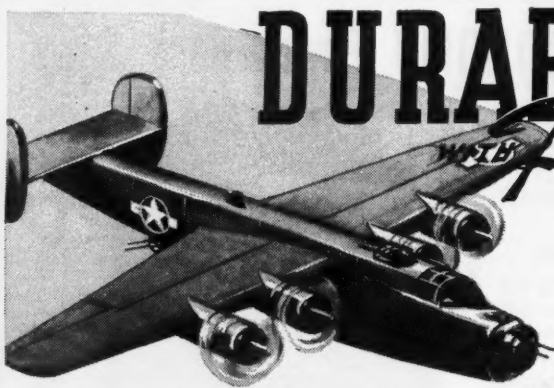
**"More Production from Landis Chasers."** To aid users of Landis chasers in obtaining maximum production from these thread cutting tools, the Landis Machine Co., Waynesboro, Pa., has prepared a 20-page booklet which illustrates and describes in an interesting manner the importance of taking proper care of Landis chasers and ways of doing same. Copy free upon request.

**Murchey Reference Manual.** Prepared by the Murchey Machine & Tool Co., Detroit 26, Mich., this manual includes helpful information on the servicing and use of threading equipment. In addition, the manual contains data on thread terms, foreign and domestic screw thread systems, recommended tap drill sizes, the design of screw machine products, metric conversion, and so on.

Of loose-leaf design so that additional information can be added as issued, the Murchey Reference Manual is available to mechanical executives addressing requests on their company letter heads.

**"Practical Hints for Employers of Women, with Special Reference to Transportation"** is the title of a pamphlet now available from the Office of Defense Transportation, Room 1220 New Post Office Bldg., Washington 25, D. C. Prepared by Dorothy Sells and Cornelia Edge, chief and assistant chief respectively of the personnel supply section in ODT's Division of Transportation Personnel, the pamphlet is a compilation of the experience of a large number of transportation companies that have employed women on a considerable scale as a result of wartime conditions.

Some of the subjects covered are: Methods of securing female labor; do's and don'ts for supervisors of women and for women employees; selection, training, and placement of women employees; basic differences between men and women to be considered in employing women; and related subjects.



# DURABILITY

## *Precision!*

THREAD PLUGS  
THREAD RINGS  
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JIGS, DIES AND FIXTURES

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May, 1945

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### YOUNG MANDREL "ROLLER CLUTCH EXPANSION"

Boost your high production 25%. This self contained unit requires no wrenches, "C" washers or power operated draw bars. Work locks automatically when placed on the mandrel. Work will not slip or jam. Young Mandrels require no adjustments.

Concentricity is maintained in LOW TENTHS for entire work length. Interchangeable sleeves reduce tool costs. No more obsolete mandrels.

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Quotations made from your detailed sketches of part and present mandrel. Good delivery schedules.

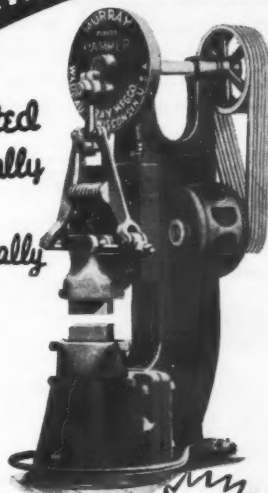
**YOUNG ARBOR COMPANY**

3257 Bradford Rd., Cleveland Heights 18, O.

**YOU CAN DO A WIDE  
RANGE OF MAINTENANCE  
WORK...**

## Murray POWER DRIVEN FORGE HAMMER

*Operated  
Electrically  
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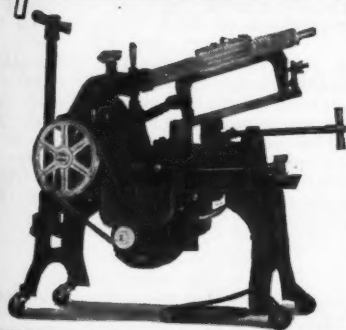


Extremely powerful yet simple in design and so flexible in operation, Murray Power Drive Forge Hammers can be operated under perfect control with little effort on the part of the operator.

They are built for long, dependable use, with low maintenance costs, and are adaptable for a wide range of light or heavy work. As the ram is free from obstruction, the operator has full vision of the work being done at all times—this is a special feature of Murray Power Driven Forge Hammers. They are also adjustable for different thicknesses of materials and dies—all models furnished for belt or motor drive. Complete information upon request, also ask about repair part service.

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### POWER HACK SAW ★



**Low Priced Self-Contained  
Portable  
Ready to Work—Economical  
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**MILLER-KNUTH MFG. CO. OMAHA, NEB.**

**D.J. Murray Manufacturing Co.**  
**WAUSAU, WISCONSIN**

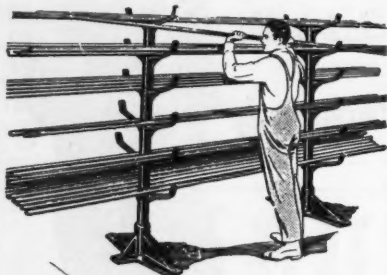
May, 1945

MODERN MACHINE SHOP 329

# SAVES TIME

IN YOUR STOCK ROOM

The BROWN SECTIONAL RACK saves the time previously lost in end-hauling each bar of stock its entire length from the old-style, closed-side Rack, the Brown Rack requiring but a few inches of side movement. Each length, width and thickness of stock is displayed in gold-fish visibility for instant selection. Workmen waiting for stock are served without waste of time.



Any time you require additional storage space, all you need do is add more units. If you want to relocate it at any time, you can do so quickly for it is unattached to the building.

It is a simple, durable article made of metal in five styles. It can't burn, warp, sag or twist: depreciation is practically nil. SEND FOR BULLETIN No. 26-M DESCRIBING THE

## BROWN SECTIONAL RACK

**BROWN ENGINEERING CO.**

120 N. THIRD ST. READING, PA.

Eddy Adjustable Screw Thread Gages are the subject of a four-page illustrated folder released by the Eddy Mfg. Co., 321 Pine St., Pawtucket, R. I. Copy free upon request.

"Safety Through Management Leadership" is the title of a 20-page pamphlet now available free from the Division of Labor Standards, U. S. Department of Labor, Washington 25, D. C. Directed primarily at the smaller war plants which do not employ safety engineers, the pamphlet cites the actual experience that plants of varying sizes have had in organizing for safety.

**Delsteel Alloy.** Delaware Tool Steel Corp., Wilmington, Del., now has available an 82-page catalog containing complete information on Delsteel Alloy and Delsteel Alloy tools, including chisels, calking tools, drift pins, rivet busters, punchers, rivet sets, riveting hammers, dies, star drills, twist drills, drill points, pneumatic chipping hammer drills, and numerous other tools. Copy free to executives on request.

"Grinding with Oil" is the title of a 16-page booklet now being issued by the D. A. Stuart Oil Co., 284½ S. Troy St., Chicago 23, Ill., illustrating and describing the use of straight oils for thread grinding, gear grinding, and other precision grinding operations. An unusual feature of the booklet is a chart comparing the wheel markings of several of the larger grinding wheel manufacturers. Copy of booklet free upon request.

**Colonial Pull-Up Broaching Machines.** A 16-page illustrated bulletin describing its line of standard pull-up broaching machines, tools, and attachments has been published by the Colonial Broach Co., P. O. Box 37, Harper Station, Detroit 13, Mich. A section devoted to the basic tooling of Colonial Pull-Up Machines, together with several pages of specification tables augmented with drawings of machines, tools, and attachments, is included. Copy of Bulletin VDS-44 free upon request.

# PALMGREN

## ANGLE—DRILL PRESS—PRODUCTION VISES



No. 000  
**ANGLE VISE—Swivel Base**



No. 250  
**MILLING ATTACHMENT VISE—2 1/2" JAWS**

**ANGLE VISES** — For Milling, Drilling, Grinding, Filing, Fitting, etc. Solve difficult angle jobs. Quick accurate set-ups without clamps, wedges or make-shift methods. Accurately machined and graduated. Hardened steel jaws, plain or grooved. 1 1/2" to 8".

**DRILL PRESS VISES** — Accurately machined. Best semi-steel castings. Long bearing and adjusting screw. Jaws hardened steel—plain or grooved. Sizes 1 1/2" to 4".

**MILLING ATTACHMENT VISE**—Just the fixture for milling operations on lathes. Fits 8"-9"-10" South Bend, Atlas, Craftsman, Sheldon, etc. Graduated vertical feed screw and 360° graduation for vertical angle adjustments. Mounts on cross slide and held by T-slot bolt. Vise has 2 1/2" jaws 1-7/16" deep grooved and plain. \$24.75.

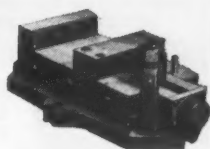
**HEAVY DUTY PRODUCTION VISES**—For fast, heavy work. Adjustable cam locking lever. Movable jaw, hardened and ground. Sizes 3" to 8" Jaws.

**FLANGED MILLING MACHINE VISE**—Clamps to table of milling machine, grinder, etc. Jaws hardened and ground. 6" wide, 2" deep.

Write for Circular 348

**CHICAGO TOOL and ENGINEERING CO.**

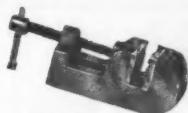
Mfrs. of Palmgren Products for Over 25 Years  
8399 South Chicago Ave., Chicago 17, Ill.



**HEAVY DUTY PRODUCTION VISE**



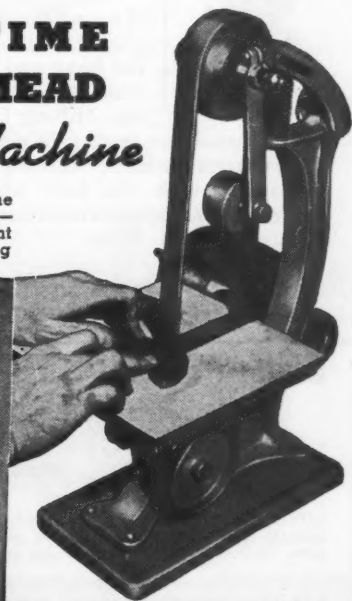
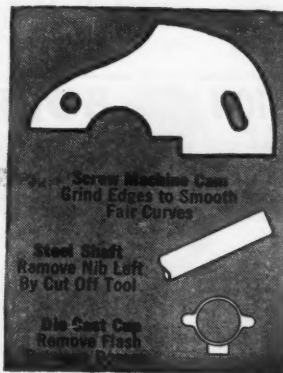
**FLANGED MILLING MACHINE VISE**



**DRILL PRESS VISE**

## 18 WAYS TO SAVE TIME & MONEY with the MEAD Industrial Burring Machine

New circular explains, illustrates 18 ways in which the Mead Industrial Burring Machine saves time and money—also contains special Grit Guide. Every industrial plant needs this "Jack-Of-All-Trades" machine. Your burring can be done in "free time" — install these machines by every machine tool which leaves burrs. Grinds, finishes both outside and inside cut-out openings. Immediate delivery in most cases. Write for the informative Money-Saving circular now.

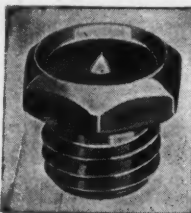


**MEAD**  
**Specialties Co.**  
4114 N. Knox Ave.  
Dept. A-545  
CHICAGO 41, ILL.

For METAL—PLASTIC—WOOD  
MODERN MACHINE SHOP 331

May, 1945

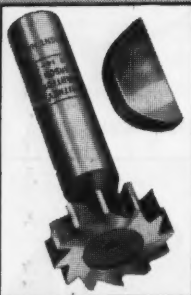
**Accurate Hole Transfer Made Easy With  
NIELSEN TRANSFER SCREWS**



Simply insert in holes, invert, strike sharply and you have centers and drill circles perfectly located. Reduce time and eliminate spoilage of other methods. 7 sizes U.S.S. Inexpensive — Last for years. Write for Circular.

**NIELSEN TOOL & DIE COMPANY**  
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**WHITNEY  
MILLING CUTTERS**



*for Uniform  
Seating of  
Whitney*

*Woodruff-type Keys*

**No need for skilled labor...or for filing and fitting...when Whitney Milling Cutters**

**are used for seating Whitney Keys. Cutters are made in all sizes to correspond with the keys which can't roll over. Complete information in Catalog V-111. Write.**

**The Whitney Chain & Mfg. Co.**  
HARTFORD 2, CONNECTICUT

**Wiedemann Type R-44 Turret Punch Press** and its application to the super-speed piercing of sheet metal through templates are fully illustrated and described in a four-page bulletin issued by the Wiedemann Machine Co., 1821 Sedgley Ave., Philadelphia 32, Pa. Copy free upon request.

**Divine Abrasive Belt Polishing Machines.** A bulletin containing illustrations, descriptions, and specifications of the VM-DBX and VCS-DBX Abrasive Belt Polishing Machines marketed by Divine Brothers Co., Utica, N. Y., has been released by this firm. Copy free upon request.

**"The 5 Keys to Lower Assembly, Repair, and Maintenance Costs"** is the title of a profusely illustrated catalog of various angle tool attachments for use with portable electric drills which is now being distributed by the Invincible Tool Co., 611 Empire Bldg., Pittsburgh, Pa. Copy of Catalog No. 46 free upon request.

**"Metcollizing."** Three processes which are applicable to iron and steel to prevent corrosion at high temperatures are described in a bulletin published by the Metallizing Engineering Co., Inc., 3822 30th St., Long Island City 1, N. Y. Covered are processes for protecting iron and steel against the corrosive action of gases at temperatures up to 1600 deg. F., from 1600 to 1800 deg. F., and above 1800 deg. F., respectively. Copy of Bulletin 45 free upon request.

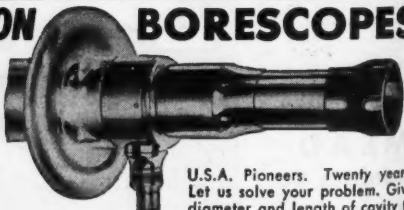
**ILLUMINATED INSPECTION**



LENOX Instruments explore the dark holes of industry—guns, turbine rotors, hollow shafts, tubes, tanks, well drill pipe, cartridge cases, etc.

**LENOX INSTRUMENT COMPANY**

**BORESCOPIES**



U.S.A. Pioneers. Twenty years. Let us solve your problem. Give diameter and length of cavity to be inspected.

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PHILADELPHIA 3, PA.**

# BUTTERFIELD THRED-RITE DIES

The modern adjustable collet die at its best.

Engineered to meet the demand for screw thread parts production on high speed equipment.



These dies can be used not only in our own Floating and Releasing Type Holders but also in any Holder designed for dies of this type.

For accuracy, speed and long life specify Thred-Rite.

## UNION TWIST DRILL CO. BUTTERFIELD DIVISION

Factories: Derby Line, Vermont, U. S. A.

Athol, Mass.; Mansfield, Mass.;

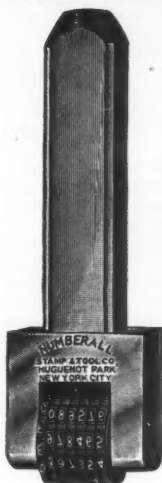
Rock Island, Quebec, Can.

### STORES:

Cleveland.....2902 Euclid Ave.  
Chicago.....11 S. Clinton St.  
Detroit.....5527 Woodward Ave.  
New York.....61 Reade St.

# NUMBERALL

## Multi-Wheel Numbering Machine Model 70



The most efficient method of stamping numbers into metal. Repeats the same numbers until changed. Model 70 NUMBERALL. Machines are used in all industries to mark various parts. Stamps numbers, etc., quickly...neatly. Perfectly aligned. Much better marks are produced by these machines than by single stamps or steel type, and at a far lower cost. Shank for Hand or Press and with any number of wheels from 3 to 20.

Model No. 70

Write for  
Bulletin MS-70.

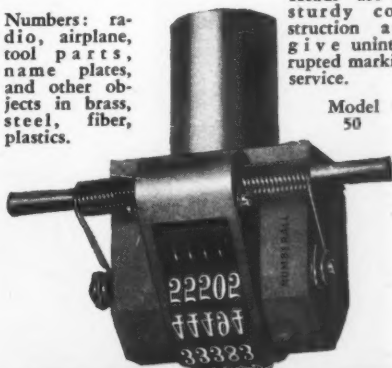
## AUTOMATIC INDENTING NUMBERING HEAD • MODEL 50

Automatic indenting numbering head for consecutive or repeat numbering.  $1/32"$  up to  $3/8"$  high figures can be furnished in sharp face Gothic or shaded Roman figures. Prefix or suffix letter wheels. Bench, foot, or power presses can be used.

Numbers: radio, airplane, tool parts, name plates, and other objects in brass, steel, fiber, plastics.

Heads are of sturdy construction and give uninterrupted marking service.

Model  
50



NUMBERALL STAMP & TOOL CO.  
HUGUENOT PARK STATEN ISLAND 12, N. Y.



**Divine Flexspeed and Lo-Flex Lathes** for polishing, buffing, and other finishing operations are covered as to construction features, specifications, and so on, in illustrated bulletin now being distributed by Divine Brothers Co., Utica, N. Y. Copy free upon request.

**"Fleet-Welding."** A method for increasing the speed of welding mild steel, to be known as "Fleet-Welding," is described in a 48-page bulletin published by The Lincoln Electric Co., Cleveland 1, Ohio.

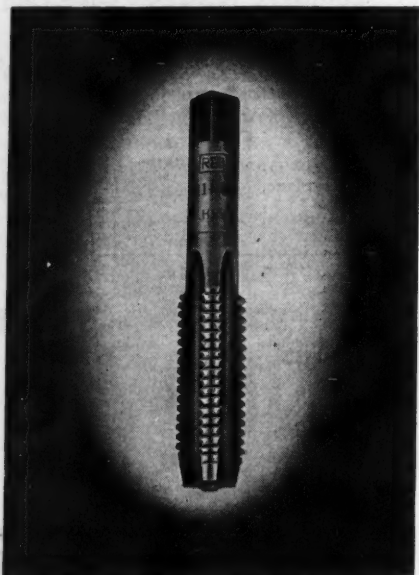
Some of the important subjects covered in the bulletin include; using "arc force" to increase welding speed; effect of penetration of welding costs; cost reduction with "Fleet-Welding"; factors affecting production speed, and general information for use of procedure tables. The bulletin also contains complete information with corrective suggestions on the procedures used for butt welds, fillet and lap welds. Several pages are devoted to the procedures used in welding 18-gauge to 10-gauge sheet metal, with tables giving electrodes type and size, electrode polarity, current, arc speed, pounds of electrode per foot of

weld and recommended fit-up for butt welds, fillet welds, lap welds, corner welds, and edge welds.

In addition to 29 photographs and drawings illustrating the "Fleet-Welding" technique, the bulletin includes procedure tables which list plate thickness, electrodes size, current, melt-off rate, arc speed, number of passes, feet of joint welded per hour, and pounds of electrode per foot of weld. Copy of Bulletin No. 440 free to executives upon request.

**ML External Indicating Gages** for use with the "Metricator" instrument are pictured and described in a four-page folder released by Metrical Laboratories, Inc., 407 Detroit St., Ann Arbor 4, Mich. Copy free upon request.

**ABC Drill Jig Bushings.** A plastic-bound catalog of A. S. A. Standard drill jig bushings has been prepared by the Accurate Bushing Co., Garwood, N. J. Listed are head and headless press fit bushings, fixed and slit renewable bushings, headless liners, and so on. Copy of Catalog No. 243 free to executives.



## Dependability

Prominent Manufacturers in every field of Metal Manufacturing industry depend upon Reiff & Nestor Company for their requirements of Taps.

And when we say "depend" we mean not only prompt delivery, we mean they who have used them depend on R&N quality, accuracy and engineering service which includes assistance in giving the correct type of Tap for every job.

We invite you to try Reiff & Nestor dependable Taps and service.



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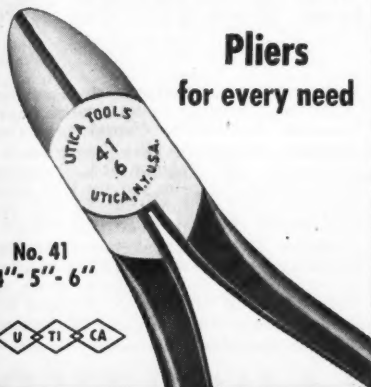
LYKENS

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# Utica Tools

FOR MORE TOOL MILEAGE



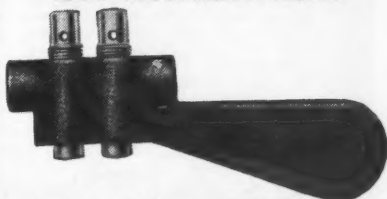
**Pliers**  
for every need

No. 41  
4"-5"-6"



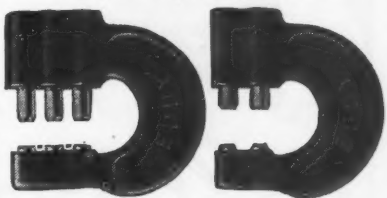
**UTICA DROP FORGE**  
AND TOOL CORPORATION  
UTICA, N. Y.

## EDDY ADJUSTABLE GAGES



**INSIDE — OUTSIDE — SCREW THREAD**

*Send for complete information*



**EDDY MANUFACTURING COMPANY**  
321 PINE STREET      PAWTUCKET, R. I.

# MOTORIZED HOPPER UNITS

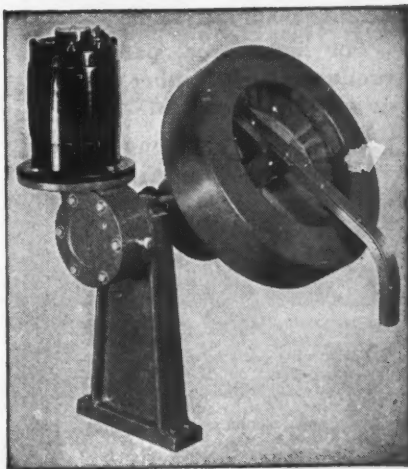
ADAPTABLE TO ANY  
MACHINE.

FEED BULLET CORES,  
SCREWS, PINS, WASHERS,  
BEARING ROLLERS, NUTS,  
RIVETS, SPECIAL PARTS.

*Send Samples for  
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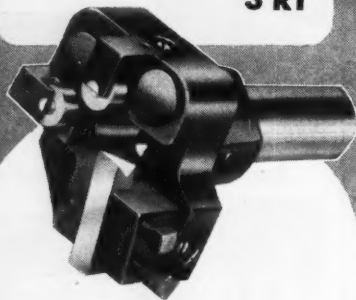
**DETROIT POWER  
SCREWDRIVER CO.**

2807 West Fort St.  
DETROIT 16 • MICHIGAN



A large Screw Machine Tool for quick, accurate set-up and precision performance. Shank diameter,  $1\frac{1}{4}$ " or  $1\frac{1}{2}$ ". Maximum turning capacity  $1\frac{1}{4}$ ".

**3 RT**



## TWO *New* SCREW MACHINE TOOLS by Boyar-Schultz

Two new Screw Machine Tools, made with the usual thoroughness of design and workmanship that is so well known in other tools of Boyar-Schultz manufacture.

For high speed, precision production with either hand or automatic Screw Machines.

**BOYAR-SCHULTZ CORPORATION**

2110 Walnut Street Chicago 12



**000 RT**

For turning parts as small as .075" (with rollers) or .020" (with carbide blocks). A finely made Screw Machine Tool, rigidly built for maximum accuracy. Designed for quick and easy set-up.

**Metex Coolant and Cutting Oil Strainers** for use on grinders, lathes, broaching machines, hobbing machines, screw machines, drillers, and boring machines are illustrated and described in a four-page folder now available free from the George Butler Co., 1015 Washington Blvd., Chicago 7, Illinois.

**Sure-Flow Centrifugal Coolant Pumps.** A 28-page catalog covering the improved line of Sure-Flow Centrifugal Coolant Pumps offered by the Logansport Machine Co., 901 Payson Rd., Logansport, Ind., has been released by this firm. In addition to complete details and specifications of the improved line, which now includes 27 sizes and types of pumps, the catalog contains considerable helpful and practical engineering data, such as tables showing friction of viscous liquids and water in pumps. Copy of Catalog No. 62 free upon request.

**Victor 1945 Apparatus Catalog.** A 104-page unusually attractive plastic-bound catalog which provides a pictorial review of Victor gas welding and flame cutting apparatus has been issued by the Victor Equipment Co., 844 Folsom St., San Francisco 7, Calif. The catalog describes and illustrates in full color various types of cutting and welding torches, goggles, regulators, nozzles, tips, and other equipment. Copy of catalog is available to mechanical executives addressing requests on their company letterheads.

**Cooper-Bessemer Employee Suggestion System.** A profusely illustrated 40-page handbook containing details of the Cooper-Bessemer recently adopted suggestion plan has been prepared by The Cooper-Bessemer Corp., Mount Vernon, Ohio. The book covers in sufficient detail all phases of the award system which is primarily based on the payment to employees of awards aggregating ten per cent of the gross savings, whichever is larger, on the basis of one year of its operation. The award plan also provides payment for intangible ideas suggested, the awards being determined by an appraisal board appointed to administer that phase of the cooperative program.

Copies are available to industrial concerns planning the inauguration of either a suggestion award plan or a program of preparation for new employees.

# SAVE HOURS of 'DOWN TIME' METCALF-DRESS

## YOUR GRINDING WHEELS

A minute with a Metcalf Wheel Dresser is time well spent—saves you hours of production time, too. The Metcalf quickly brings up short corners on thin wheels, trues up a square edge, or turns a bevel rapidly and accurately. No tearing of the wheel. Fast, efficient cutting action is assured by the three-fold Metcalf principle:

- ★ Cutting effect of one abrasive wheel upon another, when held at the proper angle.
- ★ Gyroscopic action caused by fast rotation.
- ★ Inertia caused by the weight of ball handles.

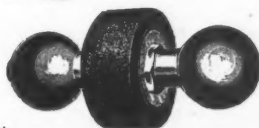
Low wheel-replacement cost means added savings and greater profits. Why not write us today for Bulletin 444-17?

Complete . . . \$5.00 Extra Wheels, only . . \$0.75

For Thin or Small Grinding Wheels

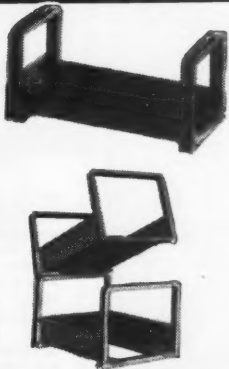
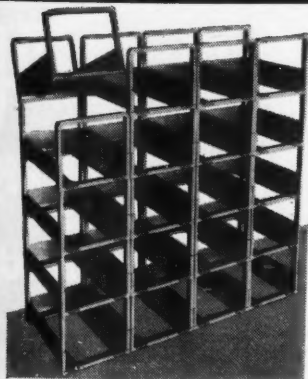


The Metcalf Minute Man says: "Spend a minute with me—save yourself hours of Production Time."



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Every box is instantly accessible when you use STACKRACKS. Heavy containers slide in and out like drawers—you can get at the contents of any one quickly and easily without disturbing the others. Patented STACKRACKS, to fit your boxes, interlock to form stor-

Manufactured and sold in Canada exclusively by  
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**STACKBINS IN STACKRACKS**

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# STACKBIN

"Stacked and



# SYSTEM

Still Accessible"

**G-E Push-Button Units, Selector Switches and Indicating Lights** for built-in (machine-tool) applications are pictured and described in a 12-page bulletin released by the General Electric Co., Schenectady 5, N. Y. Copy of Bulletin GEA-4254 free upon request.

**G-E Thickness Gages** for measuring the thickness of non-magnetic materials are fully illustrated and described as to construction, application, operation, and so on, in an eight-page catalog published by the General Electric Co., Schenectady 5, N. Y. Copy of Catalog GEA-4363 free upon request.

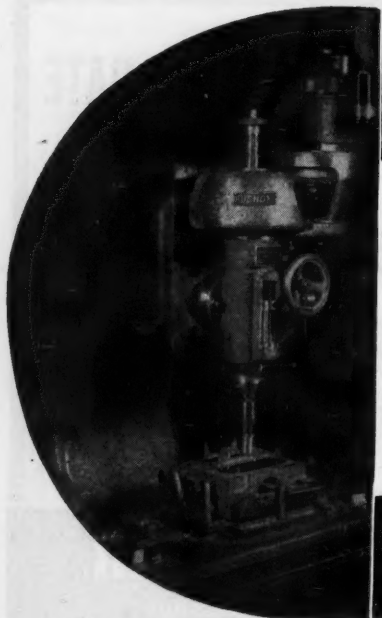
**Campbell Hudorkut.** An eight-page catalog released by the Andrew C. Campbell Division, American Chain and Cable Co., Inc., Bridgeport 2, Conn., features the Campbell Hudorkut Model No. 1 Abrasive Cutting Machine. The catalog includes both interior and exterior views of the machine, illustrations of typical pieces cut on the unit, as well as close-up views showing the cutting action of the machine. Copy free upon request.

**Lapointe Broaches and Broaching Machines.** The principle of broaching is graphically presented in the form of a book released by The Lapointe Machine Tool Co., Hudson, Mass. This file size 108-page book is plastic bound so that pages lie flat when turned and is replete with full color illustrations, engineering drawings, and typical broaching problems and solutions.

Copy of book is available to mechanical executives addressing requests on their company letterheads.

**"News Letter."** The National Tool and Die Manufacturers Association is now publishing a bi-weekly "News Letter" which is intended to keep executives in the industry posted on news of primary concern to their business. Emphasis is placed on developments within the industry itself, doings in Washington which affect it, and industrial relations.

Executives in contract tool and die companies can be placed on the News Letter mailing list by writing to the National Tool and Die Manufacturers Association, 2 West 45th St., New York 19, New York.



## MILLING - DRILLING - BORING ATTACHMENT for Heavy Duty Operations

Photo shows Rusnok head used to convert an old type milling machine into high speed, versatile, productive equipment. Uses many types of cutters on a wide range of work. Easily mounted—tilts to any angle. Large size spindle (No. 9 B & S taper). Takes 1/16" to 3/4" end mills. Large quill with 4" travel, counter balanced, hardened and ground. Six speeds 250 to 3000 RPM. Lever and worm feeds. 1/2 h.p. motor. Specially engineered by RUSNOK to meet modern demands for high speed, high precision, heavy duty end mill operations.

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Write for Illustrated Circular and Prices

## RUSNOK TOOL WORKS

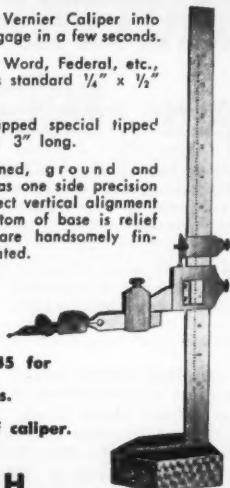
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CHICAGO 39, ILL.

## HAVE 2 TOOLS IN 1

Convert your 12" Vernier Caliper into a precision height gage in a few seconds.

1. Clamp fits Last Word, Federal, etc., indicators. Has standard  $\frac{1}{4}$ " x  $\frac{1}{2}$ " opening.
2. Ground and lapped special tipped carbide scriber. 3" long.
3. Base is hardened, ground and lapped. Slot has one side precision ground for perfect vertical alignment of caliper. Bottom of base is relief milled. Parts are handsomely finished as illustrated.



Remit \$19.45 for

3 pieces.

State make of caliper.

**SMITH  
MACHINE WORKS**

734 SECOND STREET, WEBSTER CITY, IOWA

## HURON ALL STEEL GAGE HANDLES

TAPER-LOCK and TRI-LOCK

**ALL 10 STANDARD  
SIZES**

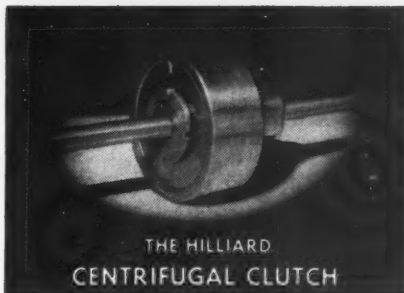


*The  
Best Costs You  
Less!*

WRITE FOR LITERATURE, PRICES, DISCOUNTS

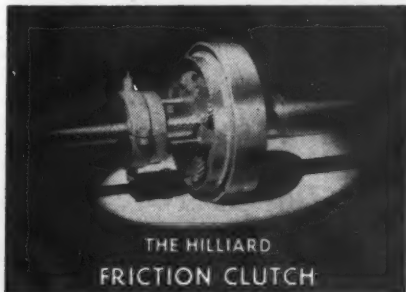
**HURON MACHINE PRODUCTS**

5555 CONNER AVE. - DETROIT, MICH.



THE HILLIARD  
CENTRIFUGAL CLUTCH

Hilliard Centrifugal Clutches and Couplings have a minimum number of parts and a wide range of adjustment. They are ideal for high speed dual drives, automatic engagement on internal combustion engine drives, starting high inertia drives, and many other purposes.



THE HILLIARD  
FRICTION CLUTCH

Hilliard Friction Clutches and Couplings are especially suitable for drives requiring smooth clutching and infrequent clutch adjustment. Their rack and gear mechanism permits very slow engagement of friction surfaces, resulting in extremely smooth load acceleration, always under control.



★ **WRITE TO-DAY!**

For the new series of 6 illustrated Bulletins furnished FREE upon request. Featuring our complete line of Industrial Clutches and Couplings—Over-Running—Single Revolution—Friction—Centrifugal—Over-load Release—Ship.

**THE HILLIARD CORPORATION**

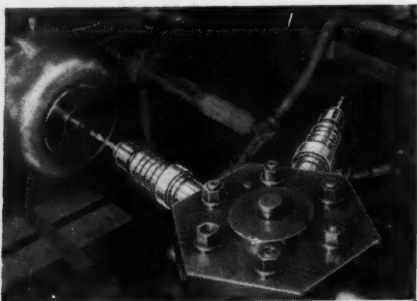
117 W. 4th St.

ELMIRA, N. Y.

Manufacturers of  
INDUSTRIAL CLUTCHES

**Cooley Muffle Type Furnace** for the heat treating of small parts is illustrated and described in a four-page bulletin published by the Cooley Electric Manufacturing Corp., 38 S. Shelby St., Indianapolis 7, Ind. A drawing showing design and construction features of the furnace, as well as a specification table, is included in the bulletin, copy of which is available by requesting Bulletin No. 50.

**Michigan "Shear-Speed" Gear Shaper** for rough and semi-finish cutting of gears up to 4 inches in diameter and 2-inch face



## AIR DRILLS FOR SCREW MACHINES

Drilling speed increased 1200 to 3500 rpm. Accurate holes with no "run-out" and less drill breakage. Write for data.



**KELLER**  
*Pneumatic Tools*

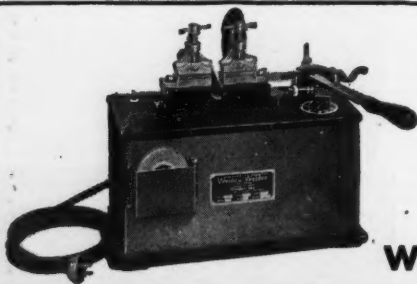
KELLER TOOL COMPANY, 4505 MILTON ST.  
GRAND HAVEN, MICH.

width is illustrated and described in a four-page bulletin, designated as the No. 1843-44, now available free from the Michigan Tool Co., 7171 E. McNichols Rd., Detroit 12, Michigan.

**"Gusher" Molten Metal Pump.** The Ruthman Machinery Co., 1817 Reading Rd., Cincinnati 2, Ohio, now has available a four-page bulletin descriptive of the various molten metal pumps recently developed by this firm. Photographs and descriptions of each model are included. One complete page is utilized in describing the various sections of the new Ruthman Catalog of Gusher Coolant Pumps. Copy free upon request.

**Grinding Wheel Data.** A 24-page supplement to the Abrasive Company Grinding Wheel Data Book, standard in the field for a number of years, is announced by the Abrasive Co., Tacony and Fraley Sts., Philadelphia 37, Pa. The data book contains sections describing the various wheels offered by the company; tables giving general recommendations for wheel selections; cross section drawings of standard types of grinding wheels; information on general offhand grinding, tool and cutter grinding, cylindrical grinding, internal grinding, surface grinding, and so on. Considerable other data concerning grinding and grinding wheels are also included in the book.

The company is also distributing a chart illustrating and explaining a standard marking system created and adopted by the Grinding Wheel Manufacturers Association for identifying grinding wheels and other bonded abrasives. Copies of this chart as well as the grinding wheel data book together with supplement are available free to executives upon request.



## BAND SAW WELDERS

No. 141 may be had without grinder or with grinder for removing flash. Has 6 point heat control, one for annealing weld.

Welds saws  $\frac{3}{4}$ " wide and smaller.

110 volt 60 cycle single phase. Can be made in 220 volt.

Send for catalog.

**WELDEX INC.**

7327 McDonald Ave.  
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# FOR LIFETIMES OF WEAR--

## HALLowell

### SHOP EQUIPMENT OF STEEL

The famous "Hallowell" Shop Equipment Line of Steel comprises a variety of shop and plant necessities to meet practically every need. Thousands of users all over the country think of "Hallowell" when they need shop equipment—they have found they can count on it to take hard usage and give good service for years and years. The "Hallowell" Work-Bench of Steel shown at right is just one of over 1300 ready-made combinations carried in stock so there is almost sure to be one to meet your requirements.

Send for the "Hallowell" Catalog of Shop Equipment.



Fig. 732

OVER 40 YEARS IN BUSINESS

## STANDARD PRESSED STEEL CO.

JENKINTOWN, PENNA. BOX 556

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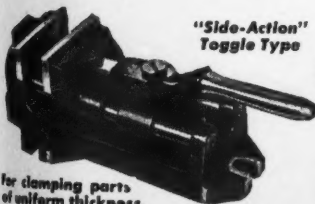
Boston, Detroit, Indianapolis, Chicago, St. Louis, San Francisco

## Why MAKE "SPECIAL" MILLING AND DRILLING FIXTURES!



"Clutch" Type,  
Toggle Action

For clamping parts  
of varying thickness.



"Side-Action"  
Toggle Type

For clamping parts  
of uniform thickness.

### Save Time and Money!

You can get production going much more quickly and at much lower cost by using a Presto-Vise with special jaws instead of making costly special fixtures for each particular job. Savings run as high as 75% as compared with the cost of special fixtures—and you can use the vise over and over again by merely changing jaws.

Send us part print for estimate 'as to cost of vise and special jaws to meet your requirements.

## D. A. SMITH & CO.

55 Selden,

Detroit 1, Mich.

Free  
CATALOG

# PRESTO-VISE

May, 1945

MODERN MACHINE SHOP 341

**Sheffer Collet Catalog No. 45.** A 20-page illustrated catalog which contains complete specifications and prices concerning the line of collets and stock pushers offered by the Sheffer Collet Co., 6432 Cass Ave., Detroit 2, Mich., has been released by this firm. Copy is available free upon request.

**Barnes Custom-Built Hydraulic Presses** are illustrated and described as to construction features, operation, specifications, and so on, in a four-page bulletin released by the John S. Barnes Corp., 301 S. Water St., Rockford, Ill. Copy of Bulletin 501-P free upon request.

**Pullmore Clutches.** A manual containing illustrated and descriptive information on the installation and servicing of Pullmore Multiple Disc Clutches has been released by the Rockford Drilling Machine Division, Borg-Warner Corporation, Rockford, Ill. Copy of manual is available free of charge to users of Pullmore Clutches.

**Woodworth "Cone-Lok" Jig** for clamping parts which are to be drilled, reamed, and so on, is fully illustrated and described as to construction features, operation, advantages, and applications in a 16-page catalog published by the N. A. Woodworth Co., Sales Division, 1300 E. Nine Mile Rd., Detroit 20, Mich. Several pages of the catalog are devoted to data sheets and dimensional drawings of the three styles in which the Cone-Lok Jig is manufactured. Copy of Catalog No. 45-J free upon request.

**"Air-Operated Tools for Maintenance, Construction, and Demolition"** is the title of a pocket-size folder published by the Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y., containing condensed information on the line of air tools and portable compressors available from this firm. Included are several photographs showing air tools in use on construction, demolition, and plant maintenance jobs, as well as illustrations of various accessories to air-tool operation, such as hose couplings, air line lubricators, and jack-bits. Copy of the folder is available free to individuals requesting Form 117.



**THE FELL PRECISION LEVEL**

The level is shown on a surface plate. The graduations .0005 of an inch per foot. It is a very accurate instrument specially designed for machine tool manufacture or maintenance. It is made in two standard sizes, and also in special types with graduations in degrees or thousandths for permanent mounting. Further information will be furnished on request.

**WM. B. FELL COMPANY**  
ROCKFORD, ILL., U.S.A.

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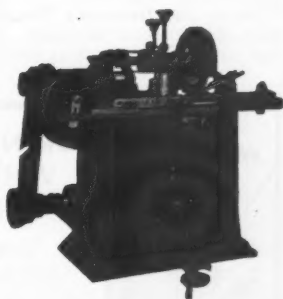
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117.

# Repays itself quickly in savings on metal cutting saws

MODEL E.C.  
GRINDER

Savings in cutting hours and greatly reduced blade replacements will enable this machine to return its investment in a short time.

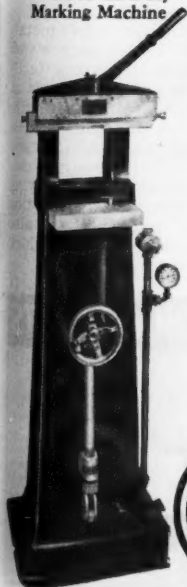
It's fully automatic, grinding from 30 to 75 teeth per minute. This is the only combination circular band and hack saw grinder made that does not depend on the shape of the grinding wheel edge to shape the cutting edge of the tooth. Available in bench and floor models. Bulletin on request.



**ALL PURPOSE:** Sharpens a wide range of sizes in circular, hack and band saws as small as 32 teeth to the inch, for metal and woodworking purposes.

**THE WARDWELL MANUFACTURING CO.**  
3166 Fulton Rd., CLEVELAND 9, OHIO

Model 25 Hi-Duty  
Marking Machine



## AVOID RAGGED MARKING!

**ROLL PART NUMBERS ON—  
QUICKLY AND ACCURATELY!**

Requires only a fraction of the applied pressure normally used for stamping—Thus preserving piece parts and adding to the life of your dies.

### RAPID SET-UPS

The economy of rolled markings is self-evident, due to its speed and ease of operation, and Hi-Duty machines are designed by us for practically any marking operation. Have you a tough marking problem? Send us prints or samples of parts to be marked—showing lettering, location and required production—We will be glad to make recommendations.

*Designed and Built by*



**GEO. T. SCHMIDT, INC.**  
1806 W. BELLE PLAINE AVENUE  
CHICAGO • 13 • ILLINOIS

**Gear Shaving Bulletin.** The National Broach and Machine Co., 5600 St. Jean, Detroit 13, Mich., announces the publication of a 16-page bulletin devoted to the principle of crossed-axis gear shaving. Profusely illustrated, the bulletin offers detailed information regarding gear shaving machines in sizes from 36 to 120 inches. Copy free upon request.

**Super-Cut Diamond Tools** for wheel dressing, thread dressing, turning, boring, and radius forming are pictured and

described in a four-page bulletin prepared by Industrial Abrasives, Inc., 3724 W. 38th St., Chicago 32, Ill. Copy free.

**Barnes 924 Vertical**, a basic machine that can be tooled and adapted to many types of high production jobs requiring up to 60 h. p. and 50,000 lb. thrust, is illustrated and described as to construction features, applications, and so on, in a four-page folder now available free from the W. F. and John Barnes Co., Rockford, Illinois.



## GRINDING WHEEL DRESSER

*"Just a twist  
of the wrist"*



Easily attached to any standard surface grinder, the JIFFY becomes a part of the machine. Dresses the wheel absolutely true, regardless of relative position of wheel to work table.

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**American Tabl-Spray Metal Washing Machine.** Bulletin No. 19 which describes the American Tabl-Spray Metal Washing Machine manufactured by the American Foundry Equipment Co., 525 S. Byrkit St., Mishawaka, Ind., has been revised to incorporate new developments in the equipment. The bulletin fully covers operating sequences, mechanical features, construction specifications and details of the machine, which is especially designed for the high speed washing of flat, fragile work or circular parts with intricate pockets and crevices. Schematic drawings and diagrams are included to illustrate the thorough spray cleaning action on the parts to be cleaned.

Briefly described is the extensive metal-cleaning laboratory of the company which is equipped with practically every facility for scientific testing and analysis of metal-cleaning problems. Short descriptions with illustrations of other models of the American metal washing machine line, including the conveyor-spray machine for washing, rinsing, and drying metal parts in one continuous operation and the tumbly-spray machine, are also presented in the bulletin, copy of which is available free upon request.

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**GRAHAM MULTI-PURPOSE VISE**

With readily insertable V and shell jaws, plus a variety of stops, guides, etc., this vise is a ready-made jig and fixture for dozens of special repeat-operation jobs. Sizes for drill press, miller, radial, planer, shaper, grinder.

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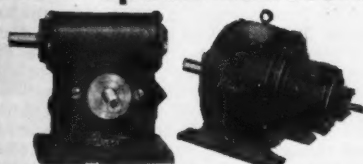
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1/50 to 1/2 h.p. Up to 417 h.p.  
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*and more efficient cutting*



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For information helping you obtain greater blade life and greater efficiency from band saw blades, turn to pages 14, 16, 17 and 21. This information covers flexible metal cutting band saw blades and contour saw blades.

Simply ask your local Capewell Distributor for this booklet. Or if there is no distributor near you, write directly to us.



MODERN MACHINE SHOP 345

May, 1945

# THIS HEAVY DUTY FLOOR PATCH

**TAKES TRAFFIC  
IMMEDIATELY**

**NO WAIT FOR SETTING**

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**La Salle Bar Steels.** A 12-page bulletin presenting important factors in the selection of furnace treated bar steels is now being distributed by the La Salle Steel Co., P. O. Box 6800-A, Chicago 80, Ill. Copy free upon request.

**"Designing for Die Casting,"** 1945 Edition. Published by the New Jersey Zinc Co., 160 Front St., New York 7, N. Y., this edition contains considerable new information assembled during the five years since the original booklet was published. Its purpose is to help users of die castings arrive at designs which take full advantage of the properties of the die casting process and avoid its limitations.

Copy of the booklet is available to mechanical executives addressing requests on their company letterheads.

**AFBMA Ball and Roller Bearing Standard Specification.** The Anti-Friction Bearing Manufacturers Association, Inc., 60 E. 42nd St., New York, N. Y., announces a manual containing standard specification data on the manufacture of ball and roller bearings. Compiled by the various engineering committees of the Anti-Friction Bearing Manufacturers Association and endorsed by the Society of Automotive Engineers and the American Standards Association, the data has been prepared with the purpose in view of eliminating many separate specifications and assisting designers in the application of standard bearings. Copy is available free to mechanical executives upon request.

**"The Tool and Die Industry Comes of Age"** is the title of a 24-page report prepared by William R. White, Jr. and Stuart H. Sinclair and published by the National Tool and Die Manufacturers Association of Cleveland and the Tool and Die Institute of Chicago. The report affords a survey and analysis of the contract tool and die industry and contains interesting and helpful information on excess profits and renegotiation problems, among other subjects, affecting the 5,000 plants in this vital industry.

Copies of the report may be purchased by writing to George S. Eaton, Executive Secretary, National Tool and Die Manufacturers Association, 1413 Union Commerce Bldg., Cleveland 14, Ohio.

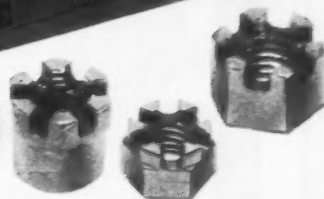
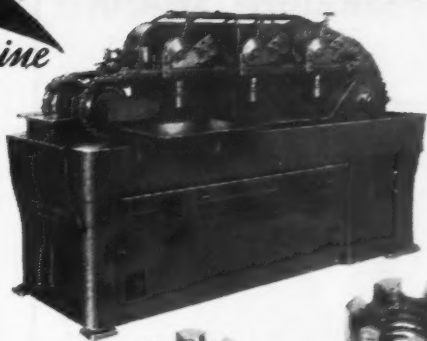


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## Special Purpose Machine

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Two continuously operating conveyors . . . Highest obtainable production...Automatic burr removal...As high as 3000 slotted nuts per hour... 2 machines covering hexagon sizes from  $\frac{3}{8}$ " to  $2\frac{1}{2}$ " . . . ALSO ADAPTABLE TO MILLING OF PARTS OF SIZES COMPARABLE TO NUTS.



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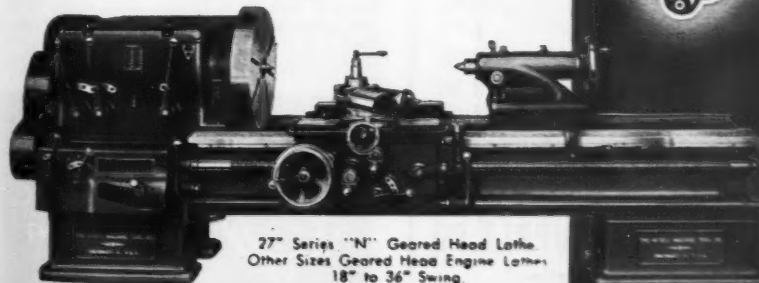
## NEBEL Geared Head Lathes

**A MODERN LATHE. ALL THE LATEST IMPROVEMENTS.**

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We also manufacture a line of Removable Block and Extension Bed Gap Lathes.  
Write for circulars.




27" Series "N" Geared Head Lathe  
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	19/64" .....	2.93
	5/16" .....	3.02
	21/64" .....	3.18
	11/32" .....	3.36
	23/64" .....	3.56
	3/8" .....	3.75
	25/64" .....	3.95
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**"Tools of Distinction"**

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**New York 13, N. Y.**

**"Common Faults Found in Designs for Arc Welding"** is the title of a profusely illustrated 24 - page pocket - size booklet published by The Hobart Bros. Co., Box 672, Troy, Ohio. Copy free upon request.

**Sheffield Contract Services.** A 16 - page profusely illustrated bulletin covering the contract services now being offered to manufacturing plants engaged in the problems of tooling for new and improved products by The Sheffield Corp., Dayton 1, Ohio, has been prepared by this firm. Copy of Bulletin No. CS-144 free upon request.

**Wiedemann Punches and Dies.** A 12 - page catalog issued by the Wiedemann Machine Co., 1821 Sedgley Ave., Philadelphia 32, Pa., illustrates and describes the complete line of high accuracy punches and dies made by the company. Also included are tabular data of decimal equivalents of numbered and lettered punches and standard U. S. gauge of sheet iron. Copy free upon request.

**Electrical Test Instruments** are the subject of a bulletin issued by Industrial Instruments, Inc., 17 Pollock Ave., Jersey City, N. J. Among the instruments featured are the direct-indicating comparison bridge, capacity and resistance limit bridges, resistance and capacitance decades, Wheatstone bridge, voltage breakdown testers and test fixtures, Kelvin bridge, megohm bridge and megohm meter, and conductivity apparatus. Copy of bulletin free upon request.



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## M-D Facing Heads

With Automatic Feed

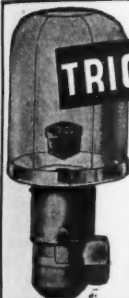
Can be attached to Boring Mill Bar, and Drilling or Milling Machine spindles. Single point tool travels radially, from center outward or reverse, feeds automatically. Sizes 6" to 46" diameter.

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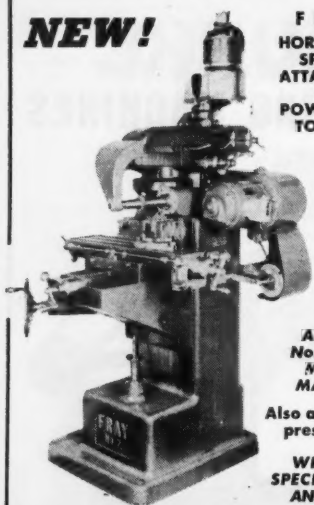
**BURKE MACHINE TOOL CO.**

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Cleveland, Ohio

May, 1945

**NEW!**



**FRAY  
HORIZONTAL  
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AND  
POWER FEED  
TO TABLE**

**FOR  
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No. 7 and 7B  
MILLING  
MACHINES**

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Manufacturers of All-Angle Milling Attachments

Also Machine Tools, Grinders, Mills and Boring Tools

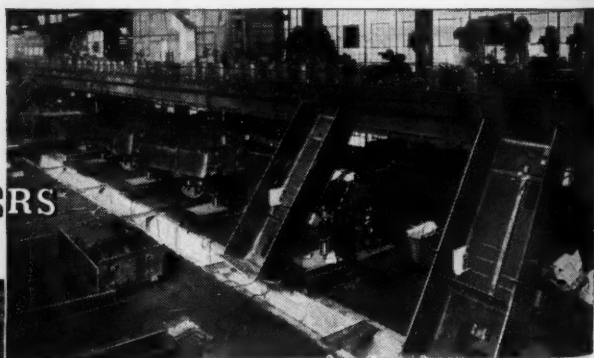
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able free from Industrial Abrasives, Inc.,  
3724 W. 38th St., Chicago 32, Illinois.

**Spartan Hack Saws and Band Saws.**  
Publication of a 40-page pocket-size cat-  
alog containing complete illustrated, de-  
scriptive, and tabular information on  
hack saws and band saws is announced  
by Spartan Saw Works, Inc., 152 Flisk  
Ave., Springfield 7, Mass. Copy free up-  
on request.

**Hardinge Master Feed Fingers with Ad-  
justable Tension** are the subject of a re-  
vised bulletin released by Hardinge Bros.,  
Inc., Elmira, N. Y. In addition to feed  
fingers as feature in the original bulletin,  
the revised bulletin includes data on Blix  
adjustable tension masters for No. 00G  
Brown & Sharpe machines and DA-2X  
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**C-F**

**POSITIONERS**



### Where a "Quick Change" is needed

In production welding, which means working on top, bottom and on all sides of the weldment, a "Quick Change" of position is necessary for greater time saving, greater efficiency, greater safety to men and materials, and with resulting lower costs. A C-F positioner will do all this at the press of a button, without crane help or handling crews—it will rotate a full 360° at variable speeds from 0 R.P.M. up, tilt to 135° beyond horizontal, and permits welding, down-hand, all sides, surfaces and angles in the one set-up with larger rods and lower passes. C-F positioners are pedestal mounted—adjustable for height. Write for Bulletin WP-22.

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May, 1945



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If you at times have difficulty in getting operators to make spindle alignments absolutely accurate in tapping or reaming, there's an easy way to end your troubles. Supply them with Ziegler Floating Holders.

By automatically compensating for inaccuracies in spindle alignment up to 1/32" radius, or 1/16" diameter, the Ziegler Holder insures perfect work in spite of carelessness on the part of the operator.

This is why the Ziegler Holder is coming into increasingly widespread use. You'll save yourself a lot of grief by changing over to Ziegler Holders for all of your tapping and reaming jobs.

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**FLOATING HOLDER**  
for Taps and Reamers...

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Top Rim Type 18" x 12" x 6".  
16 Ga. with Drop Handles  
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Steel and wood with or  
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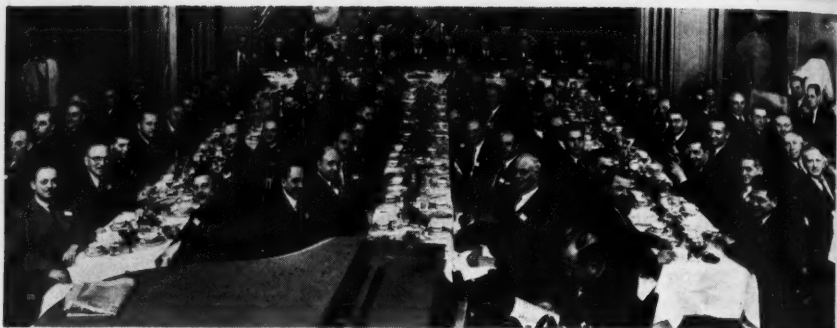
# STERLING

FACTORY EQUIPMENT CO

183 CHARLES ST.  
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May, 1945

MODERN MACHINE SHOP 351



At this dinner meeting of the New York Tool & Die Institute, the 300th member shop was enrolled in the National Tool and Die Manufacturers Association.

## NTDMA Passes 300-Member Mark At New York Regional Meeting

**O**N April 11, 1945, the 300th member shop was enrolled in the National Tool and Die Manufacturers Association. This event took place at a dinner and open forum of the New York Tool and Die Institute, attended by 125 tool and die shop executives from New York and New Jersey, held at the Hotel Sheraton, New York. The new goal of 350 members set by National President Richard F. Moore in his address was well on the way toward fulfillment when six additional shops in New York and New Jersey submitted their applications before the evening ended.

The main speaker of the evening was Dr. Walter D. Head, headmaster of the Montclair Academy and past president

of Rotary International, who spoke on the timely subject of "Learning to Live and Work Together." He stressed the important role which faces the businessman in the coming years, both as an individual and as a member of a trade association in raising his industry's standards to the end that "the conduct of business must return to businessmen where it belongs."

The toastmaster of the evening was Frank Wikstrom, president of the New York Tool and Die Institute.

The distinction of being the 300th member fell to the Standard Tool and Manufacturing Company of Arlington, N. J., one of the East's leading tool and die shops.

### LUERS

**PATENTED CUTTING OFF TOOL HOLDERS  
PATENTED CUTTING OFF BLADES**

ONLY the PATENTED construction of LUERS cutting off BLADES permits normal expansion of bursting chips — MEANS MAXIMUM CUTTING EFFICIENCY.

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# LONG LENGTH HIGH SPEED DRILLS

9" Cutting Flute  
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## Prompt Delivery

Size Inches	Length Overall Inches	Length of Flute Inches	Our Price Net Each High Speed
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7/32	12	9	3.25
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17/64	12	9	3.50
9/32	12	9	3.50
19/64	12	9	3.50
5/16	12	9	3.75
21/64	12	9	3.75
11/32	12	9	3.75
23/64	12	9	3.75
3/8	12	9	4.00
25/64	12	9	4.00
13/32	12	9	4.25
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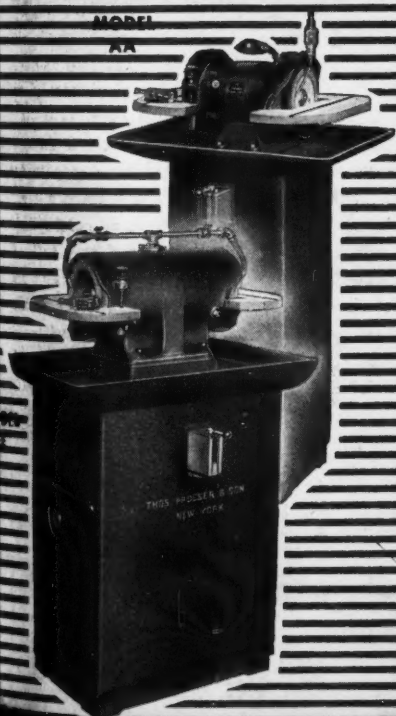
**Gorton Super-Speed Milling Machines.** Five models of adjustable ram-knee type milling machines capable of spindle speed up to 12,000 r. p. m. and employing either vertical or universal heads are described in Bulletin 1400-C published by the Gorton Machine Co., 1700 Racine St., Racine, Wis. In addition, various accessories which are designed to increase the work ranges of the machines are illustrated and their specifications and applications listed. Copy free upon request.

**Kearney and Trecker Catalog No. C10.** A 50-page illustrated milling machine tools and accessories catalog has been issued by the Kearney and Trecker Products Corp., Milwaukee 14, Wis. The catalog provides complete listings and information on arbors, cutters, vises, high speed attachments, and center scopes for every standard milling machine. A feature of the catalog is an arrangement which makes information easy to find. Copy of Catalog No. C10 free upon request.

# MODERN Machine Shop

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For fast, efficient rough grinding and fine finishing of carbides, stellite, high speed steel, and other modern tools, install Prosser Carbide Grinders. Their rugged construction, modern design, and ease of operation insure long, dependable and profitable service.

Prosser Carbide Grinders are built in bench and floor models of several capacities, for wet or dry grinding. Attachments for chip breaker and drill grinding.

#### Important features include:

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#### Model TL VALVE AND OPERATED

Positive, permanently leak-proof at. No packing.

All working parts in be removed without disconnecting pipe lines.

4 standard sizes from  $\frac{1}{4}$ " to  $\frac{3}{4}$ " standard pipe thread.



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Dual-purpose. In rest position, pedal ressure latches valve until pressed again. Second position provides infinite control within range of cylinder.

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Rapid action—up to 300 reversals per minute in  $\frac{3}{4}$ " size. 6 standard sizes from  $\frac{1}{4}$ " to 1 $\frac{1}{2}$ " standard pipe thread.



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Because the one-piece construction assures the utmost in efficiency and accuracy of operation. That is why LeBlond Lathes are equipped with one-piece, double-wall aprons. Between these double walls the rack-pinion, the rack-wheel and the hand-wheel stud are mounted from the inner side on anti-friction bearings . . . no bolted-on brackets or supports to work loose. This rigid construction maintains accurate alignment under the excessive strains of high speeds and heavy cuts. At the same time, it assures both easy movement in operation and unit compactness. It is lubricated by a positive "one shot" oiling system. The one-piece apron is another outstanding LeBlond feature.

**LEBLOND FIELD ENGINEERS ARE AT YOUR SERVICE** to help you in your development work, particularly along the lines of the difficult, the "out of the ordinary" turning problems. The accumulated knowledge of every manufacturing trend in good times and bad—peace and war—gained over a period of nearly 60 years from thousands of installations all over the world, is yours for the asking. Contact our nearest dealer or write Department FE 46.



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# Le BLOND

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the world has been turning to LeBlond for turning equipment.

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NEW YORK 4, Singer Bldg., 149 Broadway, WOrth 2-0722  
CHICAGO 4, 20 North Wacker Drive, STA 5561

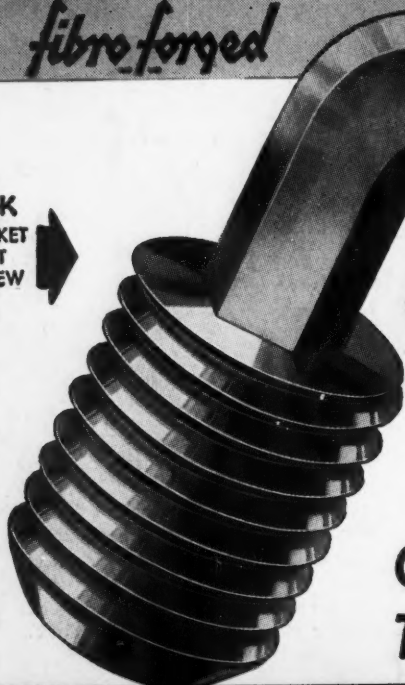
**LARGEST MANUFACTURER OF A COMPLETE LINE OF LATHES**

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*fibre-forged*

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**QUICK & POSITIVE  
TIGHTENING !**

## THE BETTER FASTENING METHOD



**ASSEMBLY TIME REDUCED  
MORE COMPACT DESIGN**

**MATERIALS AND SPACE  
USED TO FULL EFFICIENCY**

*plus*

GUARANTEED  
*Unfailing PERFORMANCE*

**COMPLETE CATALOG AVAILABLE**

**THE HOLO-KROME SCREW CORP., HARTFORD 10, CONN., U. S. A.**



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DESIGN

SPACE  
CIENCE

PERFORMANCE

AVAILABLE

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